DOCUMENTATION Abaqus2Matlab

Contents

1. Introduction

Abaqus2Matlab is a Matlab toolbox which is used to retrieve the results of an Abaqus analysis in an easy to handle form. It is developed by George Papazafeiropoulos (gpapazafeiropoulos@yahoo.gr) in an effort to facilitate the process of coupling between Abaqus and Matlab. It is written in MATLAB programming language and is available as source code distributed under a BSD-style license (see License.txt).

2. Main features and characteristics

Abaqus2Matlab is an effective tool with the following features:

2.1. It provides linking between Abaqus and Matlab. Abaqus analysis can be conducted through Matlab, without interacting with Abaqus/CAE interface, or even Abaqus/Command.

2.2. It transfers efficiently results from Abaqus to Matlab, in an error-proof way, since every contained external function is verified by its application in reading the results of a corresponding Abaqus analysis. The results of the verification of each function are presented in this toolbox in the form of html files.

2.3. It provides the requested results in a form that enables the user to easily manipulate the data for further postprocessing.

2.4. It can read 24 different kinds of nodal results (results at nodes), 23 different kinds of elemental results (results at the element integration points or results regarding whole elements) and 3 different kinds of analysis results (e.g. node definitions, element connectivity, eigenfrequencies and eigenvalues, etc.)

2.5. A complete documentation package is provided along with the source code in this toolbox.

2.6. It covers most types of Abaqus analyses and results. A sufficient number of functions is included in the toolbox to capture the most usually requested Abaqus results.

3. Setup all files and folders

All files and folders of Abaqus2Matlab toolbox have to be setup in the current folder of Matlab, which must be the folder of the toolbox. This folder should be placed in the Abaqus working directory, although this is not mandatory. In any case, the files generated in Abaqus runs will be placed one level up (outside) from the toolbox folder.

3.1. Find the directory containing this file

```
S = which('Documentation.m');
S = S(1:end-16);
```

3.2. Setup all files and folders inside the directory where Abaqus2Matlab toolbox is found

```
addpath(genpath(S));
```

4. Source code files

The source code files and folders used in this toolbox are the following:

4.1. A function named Fil2str that converts the contents of the results file into a one-row string to be further used in Matlab. This conversion is necessary because the results file is written as a sequential file, i.e. all words in the results file are of the same length (all rows in the file have the same length). Details

4.2. A folder named **OutputAnalysis** which contains the functions for the processing of the analysis results (e.g. node definitions, element connectivity, eigenfrequencies and eigenvalues, etc). See Analysis result types to find which record key and which function is associated with each of the possible analysis result type and List of functions used for any file output request

4.3. A folder named **OutputNodes** which contains the functions for the processing of the nodal results. See Node result types to find which record key, which output variable identifier and which function is associated with each of the possible nodal result types and List of functions used for any node file output request

4.4. A folder named **OutputElements** which contains the functions for the processing of the element results (results at the element integration points or results regarding whole elements). See Element result types to find which record key, which output variable identifier and which function is associated with each of the possible element result types and List of functions used for any element file output request.

4.5. This script (Documentation.m).

5. Verification files

All the functions provided with this toolbox and associated with obtaining analysis, element or node results are verified to ensure that the work correctly and they are not error-prone. In the verification process a suitable Abaqus input file, in which the option for the extraction of the desired results in an ascii results file (.fil) is specified, is run by Abaqus, after being copied from the **AbaqusInputFiles** folder outside the folder of this toolbox (no matter where it is placed), which must be the Abaqus working directory. After the Abaqus analysis terminates and the results file is created in the Abaqus working directory, it is processed appropriately by Matlab to obtain the requested results. Finally, the results are presented and checked with regard to their class and size. See here for a complete list of the functions verified and the verification results for each function. The verification source codes are contained in the folder named **MatlabExamples**.

The verification of this toolbox was made using Abaqus 6.13.

6. Supplementary files

Except for the source code files and folders used in this toolbox other supplementary files and folders are provided, which are the following:

6.1. A folder named **AbaqusInputFiles** which contains the input files which are run by Abaqus. These Abaqus files can be run by opening Abaqus/Command and typing "abaqus job=X" where X is the name of the Abaqus input file without the extension (*.inp). Each Abaqus input file is named with a number, let it be Y, which is the record key of the output variable identifier. The Abaqus input file Y.inp is run by Abaqus and produces results which are obtained after Abaqus completes the analysis by the function RecY.m. The Abaqus input files can be opened in any simple text editor, to view the various options specified in them.

6.2. A folder named **help** which contains all the source files which are published in the documentation, including this one and do not include any verification examples. Such source files include the record key tables, function lists, etc.

6.3. A folder named **html** which contains all the html files of the documentation of this toolbox, including all the html files produced by publishing the verification examples of this toolbox. All the verification examples contained in the folder **MatlabExamples** and the editing files of the external functions and the Abaqus input files contained in the folder **help** are published by Matlab in this folder and are accessible through the documentation.

7. Demonstration of Abaqus2Matlab toolbox

Follow the instructions below to watch step by step an example verification procedure of the toolbox:

7.1. Ensure that Abaqus license server has started successfully.

7.2. Place the folder of the toolbox in the Abaqus working directory (usually C:\Temp)

7.3. Open the file named "Documentation.m" in Matlab and run it (press F5)

7.4. Type in the command window of Matlab the name of the file to be executed (it will be one of the verification files in the **MatlabExamples** folder) without its extension. The name of the file is of the form VerifyX, where X is the name of the Abaqus input file (X.inp) which is run by Abaqus to produce the corresponding results file X.fil in the Abaqus working directory. The information contained in X.fil is processed by the external Matlab function RecX.m, to give the requested output. For example by typing Verify8 in the command window of Matlab, the file 8.inp is run by Abaqus, after the analysis the file 8.fil is created in the Abaqus working directory, and the function Rec8.m obtains the requested results.

7.5. After the source code in the file VerifyX.m has run, the results of the Abaqus results file X.fil will appear in the command window. The results of the run can be viewed in the documentation which accompanies this toolbox. A complete list of the verification results for all Abaqus results postprocessing functions can be found here.

8. Instructions for use of Abaqus2Matlab toolbox

Follow the instructions below to run and use the toolbox:

8.1. Ensure that Abaqus license server has started successfully.

8.2. Place the folder of the toolbox in the Abaqus working directory (usually C:\Temp). Usually, this step is not necessary, since Abaqus can run from any directory. This action is suggested, however, to avoid confusion with the large number of files which are created in each Abaqus run.

8.3. Open the file named "Documentation.m" in Matlab and run it (press F5)

8.4. The source codes in the matlab verification files (VerifyX.m) can be followed to extract the results of an arbitrary Abaqus input file.

8.5. To extract an arbitrary Abaqus analysis result from an Abaqus results file, initially the record key and the output variable identifier have to be specified. These can be obtained from Analysis result types for an analysis-type output, Element result types for an element-type output, and from Node result types for a node-type output.

8.6. To view the instructions for use of each function, type "doc RecX" or "help RecX" (where X is the record key found in step 8.5 above) in the Matlab command window. the first option shows the function manual in a matlab browser, whereas the second option shows the function manual in the matlab command window. In the manual of each function the necessary options to be included in the Abaqus input file are shown.

8.7. Construct the relative Abaqus input file, and place it in the Abaqus working directory. It is supposed that until here, the Abaqus input file is ready to be run by Abaqus.

8.8. Run the Abaqus input file in Abaqus, either by opening Abaqus/Command and typing "abaqus job=X", then enter, or by typing in the Matlab command window "!abaqus job=X", then enter. After the analysis terminates, the results file X.fil is automatically generated. This file is then read by Matlab to extract the requested results.

8.9. Place the file X.fil in the same directory with function Fil2str. Type in the Matlab command window "Rec= Fil2str ('X.fil')". The variable Rec is a one-row string containing the information contained in the X.fil file.

8.10. Type in the Matlab command window "out=RecX(Rec)". The variable out contains the requested results, extracted from the X.fil results file. It will be generally a double or cell array. For more information about the identity and/or physical meaning of each element contained in this array, one can refer to the manual of the function RecX.m (mentioned in section 8.6 above) or section 5.1.2 (Results file output format) of the Abaqus Analysis User's Guide

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```
help Fil2str
```

```
Assembly of the information in the ABAQUS results file

Syntax
    #Rec# = Fil2str(#InputFileName#);

Description
    Assemble the information contained in an ABAQUS results (*.fil) file
    in ASCII format into a string that has one row.
    The following option with parameter has to be specified in the ABAQUS
    input file for the results (*.fil) file to be created:
        ...
        *FILE FORMAT, ASCII
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #InputFileName# (string) is a string containing the name of the
        ABAQUS results (*.fil) file, along with its extension. The
        results file is generated by Abaqus after the analysis has been
        completed.

Output parameters
    #Rec# ([1 x #m#]) is a string containing the information of the
        Abaqus results file assembled in one row.
```


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List of Abaqus input files used for the verification of the external functions

Abaqus input files published with Matlab (one for each external function) used for obtaining Abaqus analysis results and included in Abaqus2Matlab toolbox.

Functions used to obtain element results

8.inp

10.inp, 11.inp, 12.inp, 13.inp, 14.inp, 18.inp, 19.inp

21.inp, 22.inp, 23.inp, 24.inp, 25.inp, 26.inp, 27.inp, 28.inp, 29.inp

31.inp, 32.inp, 33.inp, 34.inp, 35.inp, 38.inp

40.inp, 43.inp

61.inp

83.inp, 88.inp, 89.inp

90.inp, 91.inp, 97.inp

Functions used to obtain node results

101.inp, 102.inp, 103.inp, 104.inp, 105.inp, 106.inp, 107.inp, 108.inp, 109.inp

110.inp, 119.inp

120.inp

136.inp, 137.inp, 138.inp, 139.inp

145.inp, 146.inp

201.inp, 204.inp, 206.inp

214.inp

221.inp

237.inp

Functions used to obtain analysis results

1900.inp, 1901.inp

1980.inp

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA

```
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/
```

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```
type('8.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS COORDINATE OUTPUT TO MATLAB (COORD, RECORD KEY 8)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,    360
 2,      720,    0
 3,      360,    360
 4,      360,    0
*ELEMENT, TYPE=CPE4
 1, 4, 2, 1, 3
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*SOLID SECTION, ELSET=_PICKEDSET2_#1, MATERIAL=MAT1
 1,
*ELEMENT,TYPE=MASS,ELSET=MASSES
 2,1
 3,2
 4,3
 5,4
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 3
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 1, 4
*END ASSEMBLY
*MATERIAL,NAME=MAT1
*ELASTIC
 1000, 0.3
*DENSITY
 1
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*EL FILE
 COORD
*END STEP
```

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```
type('10.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL FLUX CAUSED BY HEAT OUTPUT TO MATLAB (NFLUX, RECORD KEY 10)
*NODE
 1,1.,
 7,1.,3.
 57,5.
 63,5.,3.
*NGEN,NSET=NL
 1,7,1
*NGEN,NSET=NR
 57,63,1
*NFILL,NSET=NALL
 NL,NR,8,7
*ELEMENT,TYPE=DC2D6,ELSET=EALL
 1,1,17,3,9,10,2
 13,1,15,17,8,16,9
*ELGEN,ELSET=EALL
 1,3,2,1,4,14,3
 13,3,2,1,4,14,3
*NSET,NSET=NBOT
 1,8,15,22,29,30,43,50,57
*NSET,NSET=NLFT
 1,2,3,4,5,6,7
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*CONDUCTIVITY
 4.85E-4,
*DENSITY
 0.283,
*SPECIFIC HEAT
 0.116,
*STEP
*HEAT TRANSFER,STEADY STATE
 1.,1.
*DFLUX
 EALL,BF,.3
*BOUNDARY
 NLFT,11,11,200.
 NBOT,11,11,400.
*FILE FORMAT, ASCII
*EL FILE
 NFLUX
*ENDSTEP
```

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```
type('11.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS STRESS OUTPUT TO MATLAB (S, RECORD KEY 11)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,     720,    360
 2,     720,    0
 3,     360,    360
 4,     360,    0
*ELEMENT, TYPE=CPE4
 1, 4, 2, 1, 3
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*SOLID SECTION, ELSET=_PICKEDSET2_#1, MATERIAL=MAT1
 1,
*ELEMENT,TYPE=MASS,ELSET=MASSES
 2,1
 3,2
 4,3
 5,4
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 3
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 1, 4
*END ASSEMBLY
*MATERIAL,NAME=MAT1
*ELASTIC
 1000, 0.3
*DENSITY
 1
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*EL FILE
 S
*END STEP
```

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```
type('12.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS STRESS INVARIANT OUTPUT TO MATLAB (SINV, RECORD KEY 12)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,     0,      0,      0
 2,     1,      0,      0
 3,     1,      1,      0
 4,     0,      1,      0
 5,     0,      0,      1
 6,     1,      0,      1
 7,     1,      1,      1
 8,     0,      1,      1
*ELEMENT, TYPE=C3D8
 1, 1, 2, 3, 4, 5, 6, 7, 8
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*SOLID SECTION, ELSET=_PICKEDSET2_#1, MATERIAL=MAT1
 1,
*ELEMENT,TYPE=MASS,ELSET=MASSES
 2,1
 3,2
 4,3
 5,4
 6,5
 7,6
 8,7
 9,8
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 1,2,3,4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5,6,7,8
*END ASSEMBLY
*MATERIAL,NAME=MAT1
*ELASTIC
 100000, 0.3
*DENSITY
 1
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 3, -100.
*FILE FORMAT, ASCII
*EL FILE
 SINV
*END STEP
```

```
type('13.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS SECTION FORCE AND MOMENT OUTPUT TO MATLAB (SF, RECORD KEY 13)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,    360
 2,      720,    0
 3,      360,    360
 4,      360,    0
 5,      0,      360
 6,      0,      0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*EL FILE
 SF
*END STEP
```

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```
type('14.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS ENERGY DENSITY OUTPUT TO MATLAB (ENER, RECORD KEY 14)
*RESTART,WRITE,FREQUENCY=1
*NODE
 1,
 7,60.
 13,180.
 15,228.
 19,348.
 801,,144.
 807,60.,144.
 813,180.,144.
 815,228.,144.
 819,348.,144.
 20,696.
 820,696.,144.
*NGEN,NSET=BASE
 1,7
 7,13
 13,15
 15,19
*NSET,NSET=F1
 801,
*NSET,NSET=F2,GENERATE
 802,807
*NGEN,NSET=CENTER
 1,801,100
*NGEN,NSET=TOP
 801,807
 807,813
 813,815
 815,819
*NFILL
 BASE,TOP,8,100
*NGEN,NSET=FAR
 20,820,200
*ELEMENT,TYPE=CPE8R
 1,1,3,203,201,2,103,202,101
*ELGEN,ELSET=ALL
 1,4,200,1,9,2,10
*ELSET,ELSET=PRINTELS
 1,2,3,4
*SOLID SECTION,ELSET=ALL,MATERIAL=A1
*MATERIAL,NAME= A1
*ELASTIC
 30000.,0.3
*DRUCKER PRAGER,SHEAR CRITERION=LINEAR
 30.16,1.0,30.16
*DRUCKER PRAGER HARDENING
 19.8,0.
*DRUCKER PRAGER CREEP, LAW=TIME
 2.96E-8,2
*ELEMENT,TYPE=CINPE5R
 101,219,19,20,220,119
*ELGEN,ELSET=FAR
```

```
 101,4,200,1
*SOLID SECTION,ELSET=FAR,MATERIAL=A2
*MATERIAL,NAME= A2
*ELASTIC
 30000.,0.3
*EQUATION
 2,
 F2,2,1.,801,2,-1.
*BOUNDARY
 CENTER,1
 F2,1
 BASE,1,2
*AMPLITUDE, NAME=RAMP
 0.,0.,1.,1.
*STEP,INC=50, UNSYMM=YES
 PRESCRIBE DISPLACEMENT
*VISCO, CETOL=0.01
 .025,1.,,.1
*BOUNDARY, AMP=RAMP
 801,2,,-5.0
*MONITOR,NODE=801,DOF=2
*CONTROLS,ANALYSIS=DISCONTINUOUS
*FILE FORMAT, ASCII
*EL FILE
 ENER
*END STEP
```

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```
type('18.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS PORE PRESSURE OUTPUT TO MATLAB (POR, RECORD KEY 18)
*NODE
 1, 1.
 3, 4.
 7, 1., 5.
 9, 4., 5.
*NGEN, NSET=SIDE1
 1, 3
*NGEN, NSET=SIDE3
 7, 9
*NGEN, NSET=SIDE4
 1, 7, 3
*NGEN, NSET=SIDE2
 3, 9, 3
*NSET, NSET=NALL, GENERATE
 1, 9
*NSET,NSET=CORNERS1
 1,3
*NSET,NSET=CORNERS2
 3,9
*NSET,NSET=CORNERS3
 7,9
*NSET,NSET=CORNERS4
 1,7
*NSET,NSET=CORNERS
 1,3,7,9
*ELEMENT,TYPE=CPE4P, ELSET=EALL
 1, 1,3,9,7
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC
 1.E8,
*PERMEABILITY,SPECIFIC=1.0
 1.E-5,
*DENSITY
 1.4142,
*INITIAL CONDITIONS,TYPE=RATIO
 NALL,1.
*STEP
*SOILS,CONSOLIDATION
 1. , 1.
*FILE FORMAT, ASCII
*EL FILE
 POR
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS, 8
*DLOAD,OP=NEW
 1,CENTRIF,100.,0.,2.5,0.,0.,0.,1.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1.,1.
*DLOAD, OP=NEW
```

```
 1, BX, 100.
 1, BY, 100.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, GRAV, 100.,1,1,0
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, P1, 100.
 1, P3, 100.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, P2, 100.
 1, P4, 100.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, HP4, 100., 5., 0.
 1, HP2, 100., 5., 0.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, HP1, 100., 5., 0.
 1, HP3, 100., 5., 0.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS3, 8
*DLOAD, OP=NEW
*FLOW, OP=NEW
 1, Q1, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY,OP=NEW
 NALL, 1,2
 CORNERS4, 8
*FLOW, OP=NEW
 1, Q2, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
```

```
 CORNERS1, 8
*FLOW, OP=NEW
 1, Q3, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS2, 8
*FLOW, OP=NEW
 1, Q4, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS3, 8
*FLOW, OP=NEW
*DFLOW, OP=NEW
 1, S1, 3.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS4, 8
*DFLOW, OP=NEW
 1, S2, 3.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS1, 8
*DFLOW, OP=NEW
 1, S3, 3.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS2, 8
*DFLOW, OP=NEW
 1, S4, 3.E-5
*END STEP
```

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```
type('19.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS ENERGY (SUMMED OVER ELEMENT) OUTPUT TO MATLAB (ELEN, RECORD KEY 19)
*RESTART,WRITE,FREQUENCY=1
*NODE
 1,
 7,60.
 13,180.
 15,228.
 19,348.
 801,,144.
 807,60.,144.
 813,180.,144.
 815,228.,144.
 819,348.,144.
 20,696.
 820,696.,144.
*NGEN,NSET=BASE
 1,7
 7,13
 13,15
 15,19
*NSET,NSET=F1
 801,
*NSET,NSET=F2,GENERATE
 802,807
*NGEN,NSET=CENTER
 1,801,100
*NGEN,NSET=TOP
 801,807
 807,813
 813,815
 815,819
*NFILL
 BASE,TOP,8,100
*NGEN,NSET=FAR
 20,820,200
*ELEMENT,TYPE=CPE8R
 1,1,3,203,201,2,103,202,101
*ELGEN,ELSET=ALL
 1,4,200,1,9,2,10
*ELSET,ELSET=PRINTELS
 1,2,3,4
*SOLID SECTION,ELSET=ALL,MATERIAL=A1
*MATERIAL,NAME= A1
*ELASTIC
 30000.,0.3
*DRUCKER PRAGER,SHEAR CRITERION=LINEAR
 30.16,1.0,30.16
*DRUCKER PRAGER HARDENING
 19.8,0.
*DRUCKER PRAGER CREEP, LAW=TIME
 2.96E-8,2
*ELEMENT,TYPE=CINPE5R
 101,219,19,20,220,119
*ELGEN,ELSET=FAR
```

```
 101,4,200,1
*SOLID SECTION,ELSET=FAR,MATERIAL=A2
*MATERIAL,NAME= A2
*ELASTIC
 30000.,0.3
*EQUATION
 2,
 F2,2,1.,801,2,-1.
*BOUNDARY
 CENTER,1
 F2,1
 BASE,1,2
*AMPLITUDE, NAME=RAMP
 0.,0.,1.,1.
*STEP,INC=50, UNSYMM=YES
 PRESCRIBE DISPLACEMENT
*VISCO, CETOL=0.01
 .025,1.,,.1
*BOUNDARY, AMP=RAMP
 801,2,,-5.0
*MONITOR,NODE=801,DOF=2
*CONTROLS,ANALYSIS=DISCONTINUOUS
*FILE FORMAT, ASCII
*EL FILE
 ELEN
*END STEP
```

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```
type('21.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS TOTAL STRAIN OUTPUT TO MATLAB (E, RECORD KEY 21)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,     0,      0,      0
 2,     1,      0,      0
 3,     1,      1,      0
 4,     0,      1,      0
 5,     0,      0,      1
 6,     1,      0,      1
 7,     1,      1,      1
 8,     0,      1,      1
*ELEMENT, TYPE=C3D8
 1, 1, 2, 3, 4, 5, 6, 7, 8
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*SOLID SECTION, ELSET=_PICKEDSET2_#1, MATERIAL=MAT1
 1,
*ELEMENT,TYPE=MASS,ELSET=MASSES
 2,1
 3,2
 4,3
 5,4
 6,5
 7,6
 8,7
 9,8
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 1,2,3,4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5,6,7,8
*END ASSEMBLY
*MATERIAL,NAME=MAT1
*ELASTIC
 100000, 0.3
*DENSITY
 1
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 3, -100.
*FILE FORMAT, ASCII
*EL FILE
 E
*END STEP
```

```
type('22.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS PLASTIC STRAIN OUTPUT TO MATLAB (PE, RECORD KEY 22)
*RESTART,WRITE,FREQUENCY=1
*NODE
 1,
 7,60.
 13,180.
 15,228.
 19,348.
 801,,144.
 807,60.,144.
 813,180.,144.
 815,228.,144.
 819,348.,144.
 20,696.
 820,696.,144.
*NGEN,NSET=BASE
 1,7
 7,13
 13,15
 15,19
*NSET,NSET=F1
 801,
*NSET,NSET=F2,GENERATE
 802,807
*NGEN,NSET=CENTER
 1,801,100
*NGEN,NSET=TOP
 801,807
 807,813
 813,815
 815,819
*NFILL
 BASE,TOP,8,100
*NGEN,NSET=FAR
 20,820,200
*ELEMENT,TYPE=CPE8R
 1,1,3,203,201,2,103,202,101
*ELGEN,ELSET=ALL
 1,4,200,1,9,2,10
*ELSET,ELSET=PRINTELS
 1,2,3,4
*SOLID SECTION,ELSET=ALL,MATERIAL=A1
*MATERIAL,NAME= A1
*ELASTIC
 30000.,0.3
*DRUCKER PRAGER,SHEAR CRITERION=LINEAR
 30.16,1.0,30.16
*DRUCKER PRAGER HARDENING
 19.8,0.
*DRUCKER PRAGER CREEP, LAW=TIME
 2.96E-8,2
*ELEMENT,TYPE=CINPE5R
 101,219,19,20,220,119
*ELGEN,ELSET=FAR
```

```
 101,4,200,1
*SOLID SECTION,ELSET=FAR,MATERIAL=A2
*MATERIAL,NAME= A2
*ELASTIC
 30000.,0.3
*EQUATION
 2,
 F2,2,1.,801,2,-1.
*BOUNDARY
 CENTER,1
 F2,1
 BASE,1,2
*AMPLITUDE, NAME=RAMP
 0.,0.,1.,1.
*STEP,INC=50, UNSYMM=YES
 PRESCRIBE DISPLACEMENT
*VISCO, CETOL=0.01
 .025,1.,,.1
*BOUNDARY, AMP=RAMP
 801,2,,-5.0
*MONITOR,NODE=801,DOF=2
*CONTROLS,ANALYSIS=DISCONTINUOUS
*FILE FORMAT, ASCII
*EL FILE
 PE
*END STEP
```

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```
type('23.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS CREEP STRAIN (INCLUDING SWELLING) OUTPUT TO MATLAB (CE, RECORD KEY 23)
*RESTART,WRITE,FREQ=5
*NODE,NSET=ALLN
 1,0.,0.,0.
 2,1.,0.,0.
 3,1.,1.,0.
 4,0.,1.,0.
 5,0.,0.,1.
 6,1.,0.,1.
 7,1.,1.,1.
 8,0.,1.,1.
*ELEMENT,TYPE=C3D8R,ELSET=ALLE
 1, 1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ALLE,MATERIAL=VVE3
 1.,
*MATERIAL,NAME=VVE3
*HYPERELASTIC,N=1,MODULI=INSTANTANEOUS
 8.,2.,0.1
*VISCOELASTIC,TIME=PRONY
 0.,0.5,3.
*BOUNDARY
 1,PINNED
 2,2
 5,2
 6,2
 4,1
 5,1
 8,1
 2,3
 3,3
 4,3
*STEP,NLGEOM
*VISCO
 2.,10.,2.,10.,
*BOUNDARY
 5,3,,-.2
 6,3,,-.2
 7,3,,-.2
 8,3,,-.2
*FILE FORMAT, ASCII
*EL FILE
 CE
*END STEP
```

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```
type('24.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS TOTAL INELASTIC STRAIN OUTPUT TO MATLAB (IE, RECORD KEY 24)
*RESTART,WRITE,FREQ=5
*NODE,NSET=ALLN
 1,0.,0.,0.
 2,1.,0.,0.
 3,1.,1.,0.
 4,0.,1.,0.
 5,0.,0.,1.
 6,1.,0.,1.
 7,1.,1.,1.
 8,0.,1.,1.
*ELEMENT,TYPE=C3D8R,ELSET=ALLE
 1, 1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ALLE,MATERIAL=VVE3
 1.,
*MATERIAL,NAME=VVE3
*HYPERELASTIC,N=1,MODULI=INSTANTANEOUS
 8.,2.,0.1
*VISCOELASTIC,TIME=PRONY
 0.,0.5,3.
*BOUNDARY
 1,PINNED
 2,2
 5,2
 6,2
 4,1
 5,1
 8,1
 2,3
 3,3
 4,3
*STEP,NLGEOM
*VISCO
 2.,10.,2.,10.,
*BOUNDARY
 5,3,,-.2
 6,3,,-.2
 7,3,,-.2
 8,3,,-.2
*FILE FORMAT, ASCII
*EL FILE
 IE
*END STEP
```

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```
type('25.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS TOTAL ELASTIC STRAIN OUTPUT TO MATLAB (EE, RECORD KEY 25)
*RESTART,WRITE,FREQ=5
*NODE,NSET=ALLN
 1,0.,0.,0.
 2,1.,0.,0.
 3,1.,1.,0.
 4,0.,1.,0.
 5,0.,0.,1.
 6,1.,0.,1.
 7,1.,1.,1.
 8,0.,1.,1.
*ELEMENT,TYPE=C3D8R,ELSET=ALLE
 1, 1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ALLE,MATERIAL=VVE3
 1.,
*MATERIAL,NAME=VVE3
*HYPERELASTIC,N=1,MODULI=INSTANTANEOUS
 8.,2.,0.1
*VISCOELASTIC,TIME=PRONY
 0.,0.5,3.
*BOUNDARY
 1,PINNED
 2,2
 5,2
 6,2
 4,1
 5,1
 8,1
 2,3
 3,3
 4,3
*STEP,NLGEOM
*VISCO
 2.,10.,2.,10.,
*BOUNDARY
 5,3,,-.2
 6,3,,-.2
 7,3,,-.2
 8,3,,-.2
*FILE FORMAT, ASCII
*EL FILE
 EE
*END STEP
```

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```
type('26.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS UNIT NORMAL TO CRACK IN CONCRETE OUTPUT TO MATLAB (CRACK, RECORD KEY 26)
*NODE,NSET=ALLN
 1,0.,0.,0.
 2,1.,0.,0.
 3,1.,1.,0.
 4,0.,1.,0.
 5,0.,0.,1.
 6,1.,0.,1.
 7,1.,1.,1.
 8,0.,1.,1.
*ELEMENT,TYPE=C3D8,ELSET=ALLE
 1,1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ALLE,MATERIAL=ALLE
*MATERIAL,NAME=ALLE
*ELASTIC
 4.65E6,.18
*CONCRETE
 1300.,0.
 2200.,.000027
 3000.,.0001
 3600.,.000225
 4450.,.00055
 4650.,.001
 4200.,.002
 2000.,.0035
*FAILURE RATIOS
 1.18,.15,1.25,.2,0.
 1.18,.05,1.25,.2,40.
*TENSION STIFFENING,DEP=1
 1., 0.,      0., 0.
 0., 3.5E-4,  0., 0.
 1., 0.,     40., 0.
 0., 4.5E-4, 40., 0.
 1., 0.,      0., 2.
 0., 5.5E-4,  0., 2.
 1., 0.,     40., 2.
 0., 6.5E-4, 40., 2.
*SHEAR RETENTION,DEP=1
 1.1,0.,,,20.,0.
 0.9,0.,,,20.,2.
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 ALLN,20.
*INITIAL CONDITIONS,TYPE=FIELD,VARIABLE=1
 ALLN,1.
*BOUNDARY
 1,PINNED
 2,2
 5,2
 6,2
 4,1
 5,1
 8,1
 2,3
 3,3
```

```
 4,3
*STEP,INC=20
*STATIC,DIRECT
 1.,20.
*BOUNDARY
 7,3,,.0008
 5,3,,.0008
 6,3,,.0008
 8,3,,.0008
*FILE FORMAT, ASCII
*EL FILE
 CRACK
*END STEP
```

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```
type('27.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS SECTION THICKNESS OUTPUT TO MATLAB (STH, RECORD KEY 27)
*NODE,NSET=BOTTOM
 1,   0.0,   0.0
 2, 10.0,   0.0
 3, 20.0,   0.0
*NODE,NSET=TOP
 101,  0.0,100.0
 102, 10.0,100.0
 103, 20.0,100.0
*NFILL,NSET=NALL
 BOTTOM,TOP,10,10
*NODAL THICKNESS
 BOTTOM,3.
 TOP,1.
*NODAL THICKNESS, GENERATE
 BOTTOM,TOP,10,10
*ELEMENT,TYPE=M3D8
 1, 1,3,23,21,2,13,22,11
*ELGEN,ELSET=EALL
 1,5,20,20
*MEMBRANE SECTION,MATERIAL=A1,ELSET=EALL,NODAL
 1.0,
*MATERIAL,NAME=A1
*ELASTIC,TYPE=ISOTROPIC
 1000.0,
*BOUNDARY
 BOTTOM,1,2
 NALL,3,3
*STEP
*STATIC
*CLOAD
 101,2,166.66667
 102,2,666.66667
 103,2,166.66667
*FILE FORMAT, ASCII
*EL FILE
 STH
*END STEP
```

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```
type('28.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS HEAT FLUX VECTOR OUTPUT TO MATLAB (HFL, RECORD KEY 28)
*RESTART,WRITE,F=100
*NODE
 1, 0.0,  0.0
 11,0.0,  0.1
 12,0.01, 0.0
 22,0.01, 0.1
*NGEN,NSET=NALL
 1,11
 12,22
*ELEMENT,TYPE=DC2D4
 1, 1,12,13,2
*ELGEN,ELSET=EALL
 1, 10, 1
*SOLID SECTION,ELSET=EALL,MATERIAL=MAT
*MATERIAL,NAME=MAT
*CONDUCTIVITY
 1.40,
*SPECIFIC HEAT
 260.0,
*DENSITY
 7800.0,
*FILM PROPERTY,NAME=FILMP
 10.0,  0.0
 16.0,300.0
*AMPLITUDE,NAME=SINK
 0.0,100.0, 3600.0,200.0
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 NALL,0.0
*SURFACE, NAME=SURF1
 10, S3
*SURFACE, NAME=SURF2
 EALL, S2
*SURFACE, NAME=SURF3
 EALL, S4
*SURFACE, NAME=SURF4
 1, S1
*STEP,INC=1000,UNSYMM=YES
*HEATTRANSFER,DELTMX=20.0
 100.,3600.,,100.0
*SFILM,AMP=SINK
 SURF1,F,1.0,FILMP
*DSFLUX
 SURF2,S,0.0
 SURF3,S,0.0
 SURF4,S,0.0
*FILE FORMAT, ASCII
*EL FILE
 HFL
*ENDSTEP
```

```
type('29.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS SECTION STRAIN AND CURVATURE OUTPUT TO MATLAB (SE, RECORD KEY 29)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,     720,    360
 2,     720,    0
 3,     360,    360
 4,     360,    0
 5,     0,      360
 6,     0,      0
*ELEMENT, TYPE=B21
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*BEAM SECTION, ELSET=_PICKEDSET2_#1, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#2, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#3, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#4, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#5, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#6, MATERIAL=MAT1, SECTION=RECT
```

```
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#7, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#8, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#9, MATERIAL=MAT1, SECTION=RECT
 1,1
*BEAM SECTION, ELSET=_PICKEDSET2_#10, MATERIAL=MAT1, SECTION=RECT
 1,1
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*MATERIAL, NAME=MAT1
*ELASTIC
 230,0.3
*DENSITY
 1
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*EL FILE
 SE
*END STEP
```

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```
type('31.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS CONCRETE FAILURE OUTPUT TO MATLAB (CONF, RECORD KEY 26)
*NODE,NSET=ALLN
 1,0.,0.,0.
 2,1.,0.,0.
 3,1.,1.,0.
 4,0.,1.,0.
 5,0.,0.,1.
 6,1.,0.,1.
 7,1.,1.,1.
 8,0.,1.,1.
*ELEMENT,TYPE=C3D8,ELSET=ALLE
 1,1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ALLE,MATERIAL=ALLE
*MATERIAL,NAME=ALLE
*ELASTIC
 4.65E6,.18
*CONCRETE
 1300.,0.
 2200.,.000027
 3000.,.0001
 3600.,.000225
 4450.,.00055
 4650.,.001
 4200.,.002
 2000.,.0035
*FAILURE RATIOS
 1.18,.15,1.25,.2,0.
 1.18,.05,1.25,.2,40.
*TENSION STIFFENING,DEP=1
 1., 0.,      0., 0.
 0., 3.5E-4,  0., 0.
 1., 0.,     40., 0.
 0., 4.5E-4, 40., 0.
 1., 0.,      0., 2.
 0., 5.5E-4,  0., 2.
 1., 0.,     40., 2.
 0., 6.5E-4, 40., 2.
*SHEAR RETENTION,DEP=1
 1.1,0.,,,20.,0.
 0.9,0.,,,20.,2.
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 ALLN,20.
*INITIAL CONDITIONS,TYPE=FIELD,VARIABLE=1
 ALLN,1.
*BOUNDARY
 1,PINNED
 2,2
 5,2
 6,2
 4,1
 5,1
 8,1
 2,3
 3,3
```

```
 4,3
*STEP,INC=20
*STATIC,DIRECT
 1.,20.
*BOUNDARY
 7,3,,.0008
 5,3,,.0008
 6,3,,.0008
 8,3,,.0008
*FILE FORMAT, ASCII
*EL FILE
 CONF
*END STEP
```

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```
type('32.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS STRAIN JUMP AT NODES OUTPUT TO MATLAB (SJP, RECORD KEY 32)
*PART,NAME=PART-1
*NODE
 1,  0.0
 2,  1.0
 3,  2.0
 4,  3.0
 5,  0.0, 1.0
 6,  1.0, 1.0
 7,  2.0, 1.0
 8,  3.0, 1.0
 9,  0.0, 2.0
 10,  1.0, 2.0
 11,  2.0, 2.0
 12,  3.0, 2.0
 13,  0.0, 3.0
 14,  1.0, 3.0
 15,  2.0, 3.0
 16,  3.0, 3.0
*ELEMENT,TYPE=CPS4
 1,  1, 2, 6, 5
 2,  2, 3, 7, 6
 3,  3, 4, 8, 7
 4,  5, 6,10, 9
 5,  6, 7,11,10
 6,  7, 8,12,11
 7,  9,10,14,13
 8, 10,11,15,14
 9, 11,12,16,15
*ELSET,ELSET=EELAST, GEN
 1,4
 6,9
*ELSET,ELSET=EDAMAGE
 5,
*ELSET,ELSET=EA
 1,
*SOLID SECTION,ELSET=EELAST,MATERIAL=GLASS_EPOXY,ORIENT=RECT
 1.,
*SOLID SECTION,ELSET=EDAMAGE,MATERIAL=GLASS_EPOXY_DMG,ORIENT=RECT,CONTROLS=SCONT
 1.,
*NSET,NSET=FIX1
 1,5,9,13
*NSET,NSET=FIX2
 1,2,3,4
*NSET,NSET=FIX3,GEN
 1,16
*NSET, NSET=MOVE1
 4,8,12,16
*NSET, NSET=MOVE2
 13,14,15,16
*ORIENTATION,NAME=RECT
 1.0, 0.0, 0.0, 0.0, 1.0, 0.0
 3,0.0
*END PART
```

```
*ASSEMBLY,NAME=ASSEMBLY-1
*INSTANCE,NAME=PART-1-1,PART=PART-1
*END INSTANCE
*END ASSEMBLY
*MATERIAL,NAME=GLASS_EPOXY
*ELASTIC,TYPE=LAMINA
 53.8E9,17.9E9,0.25,8.96E9,8.96E9,6.88E9
*MATERIAL,NAME=GLASS_EPOXY_DMG
*ELASTIC,TYPE=LAMINA
 53.8E9,17.9E9,0.25,8.96E9,8.96E9,6.88E9
*DAMAGE INITIATION,CRITERION=HASHIN,ALPHA=0.0
 1034E6,1034E6,27.6E6,138E6,41.4E6,69E6
*DAMAGE EVOLUTION, TYPE=ENERGY, SOFTENING=LINEAR
 20E6,20E6,4.0E4,1.0E6
*DAMAGE STABILIZATION
 1.E-4,1.E-4,1.E-4,1.E-4
*SECTION CONTROLS, NAME=SCONT, ELEMENT DELETION=NO, MAX DEGRADATION=0.99
*STEP,INC=200
 SMALL DISPLACEMENT ANALYSIS
*STATIC
 0.01,1.0,,0.02
*BOUNDARY
 ASSEMBLY-1.PART-1-1.MOVE1, 1,1, 0.1
 ASSEMBLY-1.PART-1-1.MOVE2, 2,2, 0.1
 ASSEMBLY-1.PART-1-1.FIX1,  1,1
 ASSEMBLY-1.PART-1-1.FIX1,  3,6
 ASSEMBLY-1.PART-1-1.FIX2,  2,2
*FILE FORMAT, ASCII
*EL FILE
 SJP
*END STEP
*STEP,INC=200
 SMALL DISPLACEMENT ANALYSIS
*STATIC
 0.01,1.0,,0.02
*BOUNDARY
 ASSEMBLY-1.PART-1-1.MOVE1, 1,1, -0.1
 ASSEMBLY-1.PART-1-1.MOVE2, 2,2, -0.1
 ASSEMBLY-1.PART-1-1.FIX1,  1,1
 ASSEMBLY-1.PART-1-1.FIX2,  2,2
*END STEP
```

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```
type('33.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS FILM OUTPUT TO MATLAB (FILM, RECORD KEY 33)
*RESTART,WRITE,F=100
*NODE
 1, 0.0,  0.0
 11,0.0,  0.1
 12,0.01, 0.0
 22,0.01, 0.1
*NGEN,NSET=NALL
 1,11
 12,22
*ELEMENT,TYPE=DC2D4
 1, 1,12,13,2
*ELGEN,ELSET=EALL
 1, 10, 1
*SOLID SECTION,ELSET=EALL,MATERIAL=MAT
*MATERIAL,NAME=MAT
*CONDUCTIVITY
 1.40,
*SPECIFIC HEAT
 260.0,
*DENSITY
 7800.0,
*FILM PROPERTY,NAME=FILMP
 10.0,  0.0
 16.0,300.0
*AMPLITUDE,NAME=SINK
 0.0,100.0, 3600.0,200.0
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 NALL,0.0
*SURFACE, NAME=SURF1
 10, S3
*SURFACE, NAME=SURF2
 EALL, S2
*SURFACE, NAME=SURF3
 EALL, S4
*SURFACE, NAME=SURF4
 1, S1
*STEP,INC=1000,UNSYMM=YES
*HEATTRANSFER,DELTMX=20.0
 100.,3600.,,100.0
*SFILM,AMP=SINK
 SURF1,F,1.0,FILMP
*DSFLUX
 SURF2,S,0.0
 SURF3,S,0.0
 SURF4,S,0.0
*FILE FORMAT, ASCII
*EL FILE
 FILM
*ENDSTEP
```

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```
type('34.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS RADIATION OUTPUT TO MATLAB (RAD, RECORD KEY 34)
*RESTART,WRITE
*NODE,NSET=ALL
 1, 0., 0., 0.
 2, 7., 0., 0.
 3, 7., 0., -7.
 4, 0., 0., -7.
 5, 0., 7., 0.
 6, 7., 7., 0.
 7, 7., 7., -7.
 8, 0., 7., -7.
*NSET,NSET=FIX1
 1,2,3,4
*NSET,NSET=FIX2
 5,6,7,8
*NSET,NSET=FIX3
 1,2,6,5
*NSET,NSET=FIX4
 2,3,7,6
*NSET,NSET=FIX5
 3,4,7,8
*NSET,NSET=FIX6
 1,4,5,8
*ELEMENT,TYPE=DC3D8, ELSET=EALL
 1, 1,2,3,4,5,6,7,8
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*SURFACE,NAME=SIDE
 1,S3
*PHYSICAL CONSTANTS, ABSOLUTE ZERO=-460.,STEFAN BOLTZMANN=5.0E-8
*MATERIAL,NAME=A1
*CONDUCTIVITY
 3.77E-5,
*DENSITY
 82.9,
*SPECIFIC HEAT
 .39,
*BOUNDARY
 FIX1,11
*STEP
*HEAT TRANSFER, STEADY STATE
*DFLUX
 1, BF, .3
*FILE FORMAT, ASCII
*EL FILE
 RAD
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*BOUNDARY, OP=NEW
 FIX2, 11
*RADIATE, OP=NEW
*DFLUX, OP=NEW
 1, S1, .3
*END STEP
```

```
*STEP
*HEAT TRANSFER, STEADY STATE
*BOUNDARY, OP=NEW
 FIX1, 11
*DFLUX,OP=NEW
 1, S2, .3
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*BOUNDARY, OP=NEW
 FIX5, 11
*DFLUX,OP=NEW
 1, S3, .3
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*BOUNDARY, OP=NEW
 FIX6, 11
*DFLUX,OP=NEW
 1, S4, .3
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*BOUNDARY, OP=NEW
 FIX3, 11
*DFLUX,OP=NEW
 1, S5, .3
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*BOUNDARY, OP=NEW
 FIX4, 11
*DFLUX,OP=NEW
 1, S6, .3
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*FILM,OP=NEW
 1, F1, 75., .103
*BOUNDARY,OP=NEW
 FIX2, 11
*DFLUX,OP=NEW
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*DFLUX,OP=NEW
*FILM, OP=NEW
 1, F2, 75., .103
*BOUNDARY,OP=NEW
 FIX1, 11
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*FILM,OP=NEW
 1, F3, 75., .103
*BOUNDARY,OP=NEW
 FIX5, 11
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*FILM,OP=NEW
```

```
 1, F4, 75., .103
*BOUNDARY,OP=NEW
 FIX6, 11
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*FILM,OP=NEW
 1, F5, 75., .103
*BOUNDARY,OP=NEW
 FIX3, 11
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*FILM,OP=NEW
 1, F6, 75., .103
*BOUNDARY,OP=NEW
 FIX4, 11
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*RADIATE, OP=NEW
 1, R1, 75., 1.E-6
*BOUNDARY,OP=NEW
 FIX2,11
*FILM,OP=NEW
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*FILM, OP=NEW
*RADIATE, OP=NEW
 1, R2, 75., 1.E-6
*BOUNDARY,OP=NEW
 FIX1, 11
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*RADIATE, OP=NEW
 1, R3, 75., 1.E-6
*BOUNDARY,OP=NEW
 FIX5,11
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*RADIATE, OP=NEW
 1, R4, 75., 1.E-6
*BOUNDARY, OP=NEW
 FIX6,11
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*RADIATE, OP=NEW
 1, R5, 75., 1.E-6
*BOUNDARY,OP=NEW
 FIX3,11
*END STEP
*STEP
*HEAT TRANSFER, STEADY STATE
*RADIATE, OP=NEW
 1, R6, 75., 1.E-6
*BOUNDARY, OP=NEW
```

```
 FIX4,11
*END STEP
```

```
type('35.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS SATURATION (PORE PRESSURE ANALYSIS) OUTPUT TO MATLAB (SAT, RECORD KEY 35)
*NODE,NSET=ALLN
 1,0.,0.
 3,.00508,0.
 101,0.,.0508
 103,.00508,.0508
*NGEN,NSET=BOT
 1,3,1
*NGEN,NSET=TOP
 101,103,1
*NFILL,NSET=ALLN
 BOT,TOP,20,5
*NSET,NSET=LHS,GEN
 1,101,5
*NSET,NSET=RHS,GEN
 3,103,5
*ELEMENT,TYPE=CPE8RP,ELSET=BLOCK
 1,1,3,13,11,2,8,12,6
*ELGEN,ELSET=BLOCK
 1,10,10,1
*ELSET,ELSET=OUTE
 1,3,5,7,9
*SOLID SECTION,ELSET=BLOCK,MATERIAL=SEP2
 .02,
*MATERIAL,NAME=SEP2
*ELASTIC
 10000.,0.
*POROUS BULK MODULI
 ,2.E9
*PERMEABILITY,SPECIFIC=10000.
 3.7E-4,
*SORPTION,LAW=TABULAR,TYPE=ABSORPTION
 -100000.,.04
 -10000.,.05
 -4500.,.1
 -3500.,.18
 -2000.,.45
 -1000.,.91
 0.,1.
*SORPTION,LAW=TABULAR,TYPE=EXSORPTION
 -100000.,.09
 -10000.,.1
 -8000.,.11
 -6000.,.18
 -4500.,.33
 -3000.,.79
 -2000.,.91
 0.,1.
*SORPTION,TYPE=SCANNING
 9.45E6,
*GEL
 .0005,.0015,1.E8,500.
*INITIAL CONDITIONS,TYPE=SATURATION
 ALLN,.05
```

```
*NSET,NSET=PORN,GEN
 1,101,10
 3,103,10
*INITIAL CONDITIONS,TYPE=PORE
 PORN,-10000.
*INITIAL CONDITIONS,TYPE=RATIO
 ALLN,5.
*BOUNDARY
 BOT,2
 ALLN,1
*RESTART,WRITE,FREQ=10
*STEP
*SOILS,CONSOLIDATION
 1.E-7,1.E-7
*DLOAD
 10,P3,-500.
*CONTROLS,ANAL=DISC
*FILE FORMAT, ASCII
*EL FILE
 SAT
*END STEP
```

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```
type('38.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS MASS CONCENTRATION (MASS DIFFUSION ANALYSIS) OUTPUT TO MATLAB (CONC, RECORD
KEY 38)
*NODE,NSET=ALL
 1, 0.
 2, 7.
 3, 7., 7.
 4, 0., 7.
*NSET,NSET=FIX1
 1,2
*NSET,NSET=FIX2
 2,3
*NSET,NSET=FIX3
 3,4
*NSET,NSET=FIX4
 1,4
*ELEMENT,TYPE=DC2D3, ELSET=EALL
 1,1,2,3
 2,1,3,4
*ORIENTATION,NAME=RECT
 1.0, 0.0, 0.0, 0.0, 1.0, 0.0
 1, 0.0
*SOLID SECTION,MATERIAL=A1, ELSET=EALL,ORIENT=RECT
*MATERIAL,NAME=A1
*DIFFUSIVITY,TYPE=ORTHO,LAW=GENERAL
 3.77E-5,7.54E-5,11.31E-5
*SOLUBILITY
 1.,
*BOUNDARY
 FIX1, 11
*STEP
*MASS DIFFUSION,STEADY STATE
*FILE FORMAT, ASCII
*EL FILE
 CONC
*DFLUX,OP=NEW
 1, BF, .3
*END STEP
*STEP
*MASS DIFFUSION, STEADY STATE
*BOUNDARY,OP=NEW
 FIX3,11
*DFLUX,OP=NEW
 1, S1, .3
*END STEP
*STEP
*MASS DIFFUSION, STEADY STATE
*BOUNDARY,OP=NEW
 FIX4,11
*DFLUX,OP=NEW
 1, S2, .3
*EL FILE
 CONC
*END STEP
*STEP
```

```
*MASS DIFFUSION, STEADY STATE
*BOUNDARY,OP=NEW
 FIX1,11
*DFLUX,OP=NEW
 2, S2, .3
*EL FILE
 CONC
*END STEP
*STEP
*MASS DIFFUSION, STEADY STATE
*BOUNDARY,OP=NEW
 FIX2,11
*DFLUX,OP=NEW
 2, S3, .3
*END STEP
```

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```
type('40.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS GEL (PORE PRESSURE ANALYSIS) OUTPUT TO MATLAB (GELVR, RECORD KEY 40)
*NODE,NSET=ALLN
 1,0.,0.
 3,.00508,0.
 101,0.,.0508
 103,.00508,.0508
*NGEN,NSET=BOT
 1,3,1
*NGEN,NSET=TOP
 101,103,1
*NFILL,NSET=ALLN
 BOT,TOP,20,5
*NSET,NSET=LHS,GEN
 1,101,5
*NSET,NSET=RHS,GEN
 3,103,5
*ELEMENT,TYPE=CPE8RP,ELSET=BLOCK
 1,1,3,13,11,2,8,12,6
*ELGEN,ELSET=BLOCK
 1,10,10,1
*ELSET,ELSET=OUTE
 1,3,5,7,9
*SOLID SECTION,ELSET=BLOCK,MATERIAL=SEP2
 .02,
*MATERIAL,NAME=SEP2
*ELASTIC
 10000.,0.
*POROUS BULK MODULI
 ,2.E9
*PERMEABILITY,SPECIFIC=10000.
 3.7E-4,
*SORPTION,LAW=TABULAR,TYPE=ABSORPTION
 -100000.,.04
 -10000.,.05
 -4500.,.1
 -3500.,.18
 -2000.,.45
 -1000.,.91
 0.,1.
*SORPTION,LAW=TABULAR,TYPE=EXSORPTION
 -100000.,.09
 -10000.,.1
 -8000.,.11
 -6000.,.18
 -4500.,.33
 -3000.,.79
 -2000.,.91
 0.,1.
*SORPTION,TYPE=SCANNING
 9.45E6,
*GEL
 .0005,.0015,1.E8,500.
*INITIAL CONDITIONS,TYPE=SATURATION
 ALLN,.05
```

```
*NSET,NSET=PORN,GEN
 1,101,10
 3,103,10
*INITIAL CONDITIONS,TYPE=PORE
 PORN,-10000.
*INITIAL CONDITIONS,TYPE=RATIO
 ALLN,5.
*BOUNDARY
 BOT,2
 ALLN,1
*RESTART,WRITE,FREQ=10
*STEP
*SOILS,CONSOLIDATION
 1.E-7,1.E-7
*DLOAD
 10,P3,-500.
*CONTROLS,ANAL=DISC
*FILE FORMAT, ASCII
*EL FILE
 GELVR
*END STEP
```

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```
type('43.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS TOTAL FLUID VOLUME RATIO OUTPUT TO MATLAB (FLUVR, RECORD KEY 43)
*NODE,NSET=ALLN
 1,0.,0.
 3,.00508,0.
 101,0.,.0508
 103,.00508,.0508
*NGEN,NSET=BOT
 1,3,1
*NGEN,NSET=TOP
 101,103,1
*NFILL,NSET=ALLN
 BOT,TOP,20,5
*NSET,NSET=LHS,GEN
 1,101,5
*NSET,NSET=RHS,GEN
 3,103,5
*ELEMENT,TYPE=CPE8RP,ELSET=BLOCK
 1,1,3,13,11,2,8,12,6
*ELGEN,ELSET=BLOCK
 1,10,10,1
*ELSET,ELSET=OUTE
 1,3,5,7,9
*SOLID SECTION,ELSET=BLOCK,MATERIAL=SEP2
 .02,
*MATERIAL,NAME=SEP2
*ELASTIC
 10000.,0.
*POROUS BULK MODULI
 ,2.E9
*PERMEABILITY,SPECIFIC=10000.
 3.7E-4,
*SORPTION,LAW=TABULAR,TYPE=ABSORPTION
 -100000.,.04
 -10000.,.05
 -4500.,.1
 -3500.,.18
 -2000.,.45
 -1000.,.91
 0.,1.
*SORPTION,LAW=TABULAR,TYPE=EXSORPTION
 -100000.,.09
 -10000.,.1
 -8000.,.11
 -6000.,.18
 -4500.,.33
 -3000.,.79
 -2000.,.91
 0.,1.
*SORPTION,TYPE=SCANNING
 9.45E6,
*GEL
 .0005,.0015,1.E8,500.
*INITIAL CONDITIONS,TYPE=SATURATION
 ALLN,.05
```

```
*NSET,NSET=PORN,GEN
 1,101,10
 3,103,10
*INITIAL CONDITIONS,TYPE=PORE
 PORN,-10000.
*INITIAL CONDITIONS,TYPE=RATIO
 ALLN,5.
*BOUNDARY
 BOT,2
 ALLN,1
*RESTART,WRITE,FREQ=10
*STEP
*SOILS,CONSOLIDATION
 1.E-7,1.E-7
*DLOAD
 10,P3,-500.
*CONTROLS,ANAL=DISC
*FILE FORMAT, ASCII
*EL FILE
 FLUVR
*END STEP
```

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```
type('61.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS ELEMENT STATUS OUTPUT TO MATLAB (STATUS, RECORD KEY 61)
*PART,NAME=PART-1
*NODE
 1,  0.0, 0.0
 4,  1.0, 0.0
 13, 0.0, 1.0
 16, 1.0, 1.0
*NGEN, NSET=BOT
 1,4,1
*NGEN, NSET=TOP
 13,16,1
*NFILL, NSET=NALL
 BOT, TOP, 3, 4
*ELEMENT,TYPE=CPS4R
 1,1,2,6,5
*ELGEN, ELSET=EA
 1, 3, 1, 1, 3, 4, 3
*SOLID SECTION,ELSET=EA,MATERIAL=GLASS_EPOXY,ORIENT=RECT
 1.,
*NSET,NSET=LEFT
 1,5,9,13
*NSET, NSET=RIGHT
 4, 8, 12, 16
*ORIENTATION,NAME=RECT
 1.0, 0.0, 0.0, 0.0, 1.0, 0.0
 3,0.0
*END PART
*ASSEMBLY,NAME=ASSEMBLY-1
*INSTANCE,NAME=PART-1-1,PART=PART-1
*END INSTANCE
*END ASSEMBLY
*MATERIAL,NAME=GLASS_EPOXY
*ELASTIC,TYPE=LAMINA
 53.8E9,17.9E9,0.25,8.96E9,8.96E9,6.88E9
*DAMAGE INITIATION,CRITERION=HASHIN,ALPHA=0.0
 1034E6,1034E6,27.6E6,138E6,41.4E6,50E6
*DAMAGE EVOLUTION, TYPE=ENERGY, SOFTENING=LINEAR
 10E6,10E6,5E6,5E6
*DAMAGE STABILIZATION
 0.0001, 0.0001, 0.0001, 0.0001
*STEP,INC=200,NLGEOM
*STATIC
 0.001,0.01,,0.001
*BOUNDARY
 ASSEMBLY-1.PART-1-1.RIGHT,1,1,0.001
 ASSEMBLY-1.PART-1-1.LEFT,1,1
 ASSEMBLY-1.PART-1-1.BOT, 2,2
*FILE FORMAT,ASCII
*EL FILE
 STATUS
*END STEP
*STEP,INC=200,NLGEOM
*STATIC
 0.01,0.01,,0.001
```

```
*MODEL CHANGE, TYPE=ELEMENT, REMOVE
 PART-1-1.5,
*EL FILE
 STATUS
*END STEP
*STEP,INC=200,NLGEOM
*STATIC
 0.001,0.01,,0.001
*BOUNDARY
 ASSEMBLY-1.PART-1-1.RIGHT,1,1,0.1
*EL FILE
 STATUS
*END STEP
*STEP,INC=200,NLGEOM
*STATIC
 0.01,0.01,,0.001
*MODEL CHANGE, TYPE=ELEMENT, ADD=STRAIN FREE
 PART-1-1.5,
*EL FILE
 STATUS
*END STEP
*STEP,INC=200,NLGEOM
*STATIC
 0.001,0.01,,0.001
*BOUNDARY
 ASSEMBLY-1.PART-1-1.RIGHT,1,1,0.2
*EL FILE
 STATUS
*END STEP
```

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```
type('83.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS AVERAGE SHELL SECTION STRESS OUTPUT TO MATLAB (SSAVG, RECORD KEY 83)
*NODE
 1, 0.0, 0.0
 2, 2.0, 0.0
 3, 2.0, 1.0
 4, 0.0, 1.0
 11, 0.0, 0.0,1.0
 12, 2.0, 0.0,1.0
 13, 2.0, 1.0,1.0
 14, 0.0, 1.0,1.0
*ELEMENT,TYPE=SC8R, ELSET=EALL
 1, 1,2,3,4, 11,12,13,14
*SHELL SECTION,MATERIAL=A1, ELSET=EALL, POISSON=ELASTIC
 1.0,
*MATERIAL,NAME=A1
*ELASTIC,TYPE=ISOTROPIC
 30.0E6,0.3
*BOUNDARY
 1,1,3
 2,2,3
 3,3
 4,3
 11,1,2
 12,2,2
*STEP
*STATIC
*CLOAD
 2,1, 250.0
 3,1, -750.0
 3,2, -750.0
 4,1,-250.0
 4,2,-250.0
 12,1, 250.0
 13,1, -750.0
 13,2, -750.0
 14,1,-250.0
 14,2,-250.0
*FILE FORMAT, ASCII
*EL FILE
 SSAVG
*END STEP
```

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```
type('88.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS THERMAL STRAIN OUTPUT TO MATLAB (THE, RECORD KEY 88)
*NODE,NSET=ALL
 1, 0., 0., 0.
 2, 7., 0., 0.
 3, 7., 0., -7.
 4, 0., 0., -7.
 5, 0., 7., 0.
 6, 7., 7., 0.
 7, 7., 7., -7.
 8, 0., 7., -7.
*NSET,NSET=FIX1
 1,2,3,4
*NSET,NSET=FIX2
 5,6,7,8
*NSET,NSET=FIX3
 1,2,6,5
*NSET,NSET=FIX4
 2,3,7,6
*NSET,NSET=FIX5
 3,4,8,7
*NSET,NSET=FIX6
 1,4,8,5
*NSET,NSET=QA_TEST
 ALL
*ELEMENT,TYPE=C3D6T, ELSET=ALL
 1, 1,2,3,5,6,7
 2, 3,4,1,7,8,5
*SOLID SECTION,MATERIAL=A1, ELSET=ALL
*MATERIAL,NAME=A1
*ELASTIC
 30.E6, .3
*EXPANSION
 0.0001
*CONDUCTIVITY
 3.77E-5
*DENSITY
 82.9
*SPECIFIC HEAT
 .39
*PHYSICAL CONSTANTS, ABSOLUTE ZERO=-460.,STEFAN BOLTZMANN=.1714E-8
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*FILE FORMAT, ASCII
*EL FILE
 THE
*DLOAD, OP=NEW
 ALL,BX,100.
 ALL,BY,200.
 ALL,BZ,300.
*DFLUX
 ALL, BF, .3
*BOUNDARY, OP=NEW
 ALL, 1,3
```

```
 FIX1, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*DLOAD, OP=NEW
 ALL, GRAV, 4.51346, 1.0 , 2.0, 3.0
*DFLUX, OP=NEW
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX1, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*DLOAD, OP=NEW
*FILM, OP=NEW
 ALL, F2, 75., .103
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX1, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*DLOAD, OP=NEW
 ALL, P1, 100.
 ALL, P2, 200.
 1, P3, 300.
 1, P4, 400.
 2, P3, 500.
 2, P4, 600.
*FILM,OP=NEW
 ALL, F1, 75., .103
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX2, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*DLOAD, OP=NEW
*FILM,OP=NEW
 1, F3, 75., .103
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX5, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*FILM,OP=NEW
 1, F4, 75., .103
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX6, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*FILM,OP=NEW
```

```
 2, F3, 75., .103
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX3, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*FILM,OP=NEW
 2, F4, 75., .103
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX4, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*FILM, OP=NEW
*RADIATE, OP=NEW
 ALL, R2, 75., 2.9172E-5
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX1, 11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*RADIATE, OP=NEW
 ALL, R1, 75., 2.9172E-5
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX2,11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*RADIATE, OP=NEW
 1, R3, 75., 2.9172E-5
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX5,11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*RADIATE, OP=NEW
 1, R4, 75., 2.9172E-5
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX6,11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*RADIATE, OP=NEW
 2, R3, 75., 2.9172E-5
*BOUNDARY,OP=NEW
 ALL, 1,3
 FIX3,11
*END STEP
```

```
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*RADIATE, OP=NEW
 2, R4, 75., 2.9172E-5
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX4,11
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX2, 11
*RADIATE, OP=NEW
*DFLUX, OP=NEW
 ALL, S1, .3
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX1, 11
*DFLUX,OP=NEW
 ALL, S2, .3
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX5, 11
*DFLUX,OP=NEW
 1, S3, .3
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX6, 11
*DFLUX,OP=NEW
 1, S4, .3
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX3, 11
*DFLUX,OP=NEW
 2, S3, .3
*END STEP
*STEP
*COUPLED TEMPERATURE-DISPLACEMENT, STEADY STATE
 1., 1.
*BOUNDARY, OP=NEW
 ALL, 1,3
 FIX4, 11
```

```
*DFLUX,OP=NEW
 2, S4, .3
*END STEP
```

```
type('89.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS LOGARITHMIC STRAIN OUTPUT TO MATLAB (LE, RECORD KEY 89)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,     0,      0,      0
 2,     1,      0,      0
 3,     1,      1,      0
 4,     0,      1,      0
 5,     0,      0,      1
 6,     1,      0,      1
 7,     1,      1,      1
 8,     0,      1,      1
*ELEMENT, TYPE=C3D8
 1, 1, 2, 3, 4, 5, 6, 7, 8
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*SOLID SECTION, ELSET=_PICKEDSET2_#1, MATERIAL=MAT1
 1,
*ELEMENT,TYPE=MASS,ELSET=MASSES
 2,1
 3,2
 4,3
 5,4
 6,5
 7,6
 8,7
 9,8
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 1,2,3,4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5,6,7,8
*END ASSEMBLY
*MATERIAL,NAME=MAT1
*ELASTIC
 100000, 0.3
*DENSITY
 1
*STEP, NAME=STEP-1, NLGEOM=YES
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 3, -100.
*FILE FORMAT, ASCII
*EL FILE
 LE
*END STEP
```

```
type('90.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NOMINAL STRAIN OUTPUT TO MATLAB (NE, RECORD KEY 89)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,     0,      0,      0
 2,     1,      0,      0
 3,     1,      1,      0
 4,     0,      1,      0
 5,     0,      0,      1
 6,     1,      0,      1
 7,     1,      1,      1
 8,     0,      1,      1
*ELEMENT, TYPE=C3D8
 1, 1, 2, 3, 4, 5, 6, 7, 8
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*SOLID SECTION, ELSET=_PICKEDSET2_#1, MATERIAL=MAT1
 1,
*ELEMENT,TYPE=MASS,ELSET=MASSES
 2,1
 3,2
 4,3
 5,4
 6,5
 7,6
 8,7
 9,8
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 1,2,3,4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5,6,7,8
*END ASSEMBLY
*MATERIAL,NAME=MAT1
*ELASTIC
 100000, 0.3
*DENSITY
 1
*STEP, NAME=STEP-1, NLGEOM=YES
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 3, -100.
*FILE FORMAT, ASCII
*EL FILE
 NE
*END STEP
```

```
type('91.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS MECHANICAL STRAIN RATE OUTPUT TO MATLAB (ER, RECORD KEY 89)
*NODE,NSET=ALLN
 1,0.,0.,0.
 2,1.,0.,0.
 3,1.,1.,0.
 4,0.,1.,0.
 5,0.,0.,1.
 6,1.,0.,1.
 7,1.,1.,1.
 8,0.,1.,1.
*ELEMENT,TYPE=C3D8,ELSET=ALLE
 1,1,2,3,4,5,6,7,8
*SOLID SECTION,ELSET=ALLE,MATERIAL=ALLE
*MATERIAL,NAME=ALLE
*ELASTIC
 200.E3,.3
*PLASTIC
 200.,0.
 220.,.0009
 220.,.0029
*RATE DEPENDENT
 40.,5.
*BOUNDARY
 1,PINNED
 2,2
 5,2
 6,2
 4,1
 5,1
 8,1
 2,3
 3,3
 4,3
*STEP,INC=20
*STATIC,DIRECT
 1.E-3,20.E-3
*BOUNDARY
 7,3,,.004
 5,3,,.004
 6,3,,.004
 8,3,,.004
*FILE FORMAT, ASCII
*EL FILE
 ER
*END STEP
```

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```
type('97.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS PORE FLUID EFFECTIVE VELOCITY VECTOR OUTPUT TO MATLAB (FLVEL, RECORD KEY 89)
*PART,NAME=PART2
*NODE,NSET=SOIL
 1, 0.0, 0.0
 2, 1.0, 0.0
 3, 1.0, 1.0
 4, 0.0, 1.0
 5, 0.5, 0.0
 6, 1.0, 0.5
 7, 0.5, 1.0
 8, 0.0, 0.5
 9, 2.0, 0.0
 10, 3.0, 0.0
 11, 3.0, 1.0
 12, 2.0, 1.0
 13, 2.5, 0.0
 14, 3.0, 0.5
 15, 2.5, 1.0
 16, 2.0, 0.5
*NSET,NSET=TOP
 3,4,7, 11,12,15
*NSET,NSET=BOTTOM
 1,2,5, 9,10,13
*NSET,NSET=LEFT
 1,4,8, 9,12,16
*ELEMENT,TYPE=CPE8P,ELSET=SOIL
 1, 1,2,3,4, 5,6,7,8
*ELEMENT,TYPE=CPE8RP,ELSET=SOIL
 2, 9,10,11,12, 13,14,15,16
*END PART
*PART,NAME=PART4
*NODE,NSET=SOIL
 1, 0.0, 0.0
 2, 1.0, 0.0
 3, 1.0, 1.0
 4, 0.0, 1.0
 5, 0.5, 0.0
 6, 1.0, 0.5
 7, 0.5, 1.0
 8, 0.0, 0.5
 9, 2.0, 0.0
 10, 3.0, 0.0
 11, 3.0, 1.0
 12, 2.0, 1.0
 13, 2.5, 0.0
 14, 3.0, 0.5
 15, 2.5, 1.0
 16, 2.0, 0.5
 17, 4.0, 0.0
 18, 5.0, 0.0
 19, 5.0, 1.0
 20, 4.0, 1.0
 21, 4.5, 0.0
 22, 5.0, 0.5
```

```
 23, 4.5, 1.0
 24, 4.0, 0.5
 25, 6.0, 0.0
 26, 7.0, 0.0
 27, 7.0, 1.0
 28, 6.0, 1.0
 29, 6.5, 0.0
 30, 7.0, 0.5
 31, 6.5, 1.0
 32, 6.0, 0.5
*NSET,NSET=TOP
 3,4,7, 11,12,15, 19,20,23, 27,28,31
*NSET,NSET=BOTTOM
 1,2,5, 9,10,13, 17,18,21, 25,26,29
*NSET,NSET=LEFT
 1,4,8, 9,12,16, 17,20,24, 25,28,32
*ELEMENT,TYPE=CPE8P,ELSET=SOIL
 1, 1,2,3,4, 5,6,7,8
*ELEMENT,TYPE=CPE8RP,ELSET=SOIL
 2, 9,10,11,12, 13,14,15,16
*ELEMENT,TYPE=CPE8P,ELSET=SOIL
 3, 17,18,19,20, 21,22,23,24
*ELEMENT,TYPE=CPE8RP,ELSET=SOIL
 4, 25,26,27,28, 29,30,31,32
*END PART
*ASSEMBLY,NAME=GEOASSEMBLY
*INSTANCE,NAME=IELA,PART=PART4
 0,0,0
*SOLID SECTION,MATERIAL=MATELA, ELSET=SOIL
*END INSTANCE
*INSTANCE,NAME=IPOR,PART=PART2
 0,3,0
*SOLID SECTION,MATERIAL=MATPOR, ELSET=SOIL
*END INSTANCE
*END ASSEMBLY
*NSET,NSET=TOP
 IELA.TOP,IPOR.TOP
*NSET,NSET=BOTTOM
 IELA.BOTTOM,IPOR.BOTTOM
*NSET,NSET=LEFT
 IELA.LEFT,IPOR.LEFT
*NSET,NSET=SOIL
 IELA.SOIL,IPOR.SOIL
*ELSET,ELSET=SOIL
 IELA.SOIL,IPOR.SOIL
*MATERIAL,NAME=MATELA
*ELASTIC
 1000.0,0.3
*PERMEABILITY,SPECIFIC=10.0
 1.0,0.0
*MATERIAL,NAME=MATPOR
*POROUS ELASTIC
 .026,.3,100.0
*PERMEABILITY,SPECIFIC=10.0
 1.0,0.0
*INITIAL CONDITIONS,TYPE=RATIO
 SOIL,1.08,0.,1.08,1.
*INITIAL CONDITIONS,TYPE=STRESS
 SOIL,-10.,-10.,-10.
*BOUNDARY
 LEFT,   1,1
```

```
 BOTTOM, 2,2
*STEP,UNSYM=YES
 GEOSTATIC INITIAL STRESS STATE
*GEOSTATIC,UTOL
 0.5,1.0
*DLOAD
 SOIL,P2,100.
*BOUNDARY
 BOTTOM, 8,8
 TOP,    8,8, 100.0
*FILE FORMAT, ASCII
*EL FILE
 FLVEL
*END STEP
```

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```
type('101.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL DISPLACEMENT OUTPUT TO MATLAB (U, RECORD KEY 101)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,     360
 2,      720,     0
 3,      360,     360
 4,      360,     0
 5,      0,       360
 6,      0,       0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*NODE FILE
 U
*END STEP
```

```
type('102.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL VELOCITY OUTPUT TO MATLAB (V, RECORD KEY 102)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,    360
 2,      720,    0
 3,      360,    360
 4,      360,    0
 5,      0,      360
 6,      0,      0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*NODE FILE
 V
*END STEP
```

```
type('103.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL ACCELERATION OUTPUT TO MATLAB (A, RECORD KEY 103)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,    360
 2,      720,    0
 3,      360,    360
 4,      360,    0
 5,      0,      360
 6,      0,      0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*NODE FILE
 A
*END STEP
```

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```
type('104.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL REACTION FORCE OUTPUT TO MATLAB (RF, RECORD KEY 104)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,    360
 2,      720,    0
 3,      360,    360
 4,      360,    0
 5,      0,      360
 6,      0,      0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*NODE FILE
 RF
*END STEP
```

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```
type('105.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS ELECTRICAL POTENTIAL OUTPUT TO MATLAB (EPOT, RECORD KEY 105)
*NODE
 1, 0.0, 0.0, 0.0
 2, 2.0, 0.0, 0.0
 3, 2.0, 2.0, 0.0
 4, 0.0, 2.0, 0.0
 5, 0.0, 0.0, 1.0
 6, 2.0, 0.0, 1.0
 7, 2.0, 2.0, 1.0
 8, 0.0, 2.0, 1.0
*ELEMENT,TYPE=C3D8E, ELSET=EALL
 1, 1,2,3,4,5,6,7,8
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC,TYPE=ISOTROPIC
 30.0E6,0.3
*PIEZOELECTRIC,TYPE=S
 0.,0.,0.,0.,0.,0.,0.,0.
 0.,0.,0.,0.,0.,0.,0.,0.
 0.,0.
*DIELECTRIC,TYPE=ISO
 1.0E-3,
*BOUNDARY
 1,1,3
 2,2
 4,3
 5,1
 1,9
 2,9
 3,9
 4,9
*SURFACE, NAME=SIDE1485
 1,S6
*STEP,PERTURBATION
*STATIC
*DLOAD
 1, P1, 1000.0
 1, P2, 1000.0
 1, P3, 1000.0
 1, P4, 1000.0
 1, P5, 1000.0
 1, P6, 1000.0
*DECHARGE
 1, ES1, 1000.0
 1, ES2, 1000.0
 1, ES3, 1000.0
 1, ES4, 1000.0
 1, ES5, 1000.0
 1, ES6, 1000.0
*CLOAD
 2,1,  1500.00
 3,1,   500.00
 3,2,   500.00
 3,3, -1000.00
```

```
 4,1,   500.00
 4,2,  1500.00
 5,2,  -500.00
 5,3,  1000.00
 6,1,  -500.00
 6,2, -1500.00
 7,1, -1500.00
 7,2, -1500.00
 7,3, -1000.00
 8,1, -1500.00
 8,2,  -500.00
*CECHARGE
 1,,-2000.
 2,,-2000.
 3,,-2000.
 4,,-2000.
 5,,-1000.
 6,,-1000.
 7,,-1000.
 8,,-1000.
*FILE FORMAT, ASCII
*NODE FILE
 EPOT
*END STEP
```

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```
type('106.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL POINT LOAD OUTPUT TO MATLAB (CF, RECORD KEY 106)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,    360
 2,      720,    0
 3,      360,    360
 4,      360,    0
 5,        0,    360
 6,        0,    0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*NODE FILE
 CF
*END STEP
```

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```
type('107.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL COORDINATE OUTPUT TO MATLAB (COORD, RECORD KEY 107)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,     360
 2,      720,     0
 3,      360,     360
 4,      360,     0
 5,      0,       360
 6,      0,       0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*NODE FILE
 COORD
*END STEP
```

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```
type('108.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS PORE OR ACOUSTIC PRESSURE OUTPUT TO MATLAB (POR, RECORD KEY 108)
*NODE
 1, 1.
 3, 4.
 7, 1., 5.
 9, 4., 5.
*NGEN, NSET=SIDE1
 1, 3
*NGEN, NSET=SIDE3
 7, 9
*NGEN, NSET=SIDE4
 1, 7, 3
*NGEN, NSET=SIDE2
 3, 9, 3
*NSET, NSET=NALL, GENERATE
 1, 9
*NSET,NSET=CORNERS1
 1,3
*NSET,NSET=CORNERS2
 3,9
*NSET,NSET=CORNERS3
 7,9
*NSET,NSET=CORNERS4
 1,7
*NSET,NSET=CORNERS
 1,3,7,9
*ELEMENT,TYPE=CPE4P, ELSET=EALL
 1, 1,3,9,7
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC
 1.E8,
*PERMEABILITY,SPECIFIC=1.0
 1.E-5,
*DENSITY
 1.4142,
*INITIAL CONDITIONS,TYPE=RATIO
 NALL,1.
*STEP
*SOILS,CONSOLIDATION
 1. , 1.
*FILE FORMAT, ASCII
*NODE FILE
 POR
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS, 8
*DLOAD,OP=NEW
 1,CENTRIF,100.,0.,2.5,0.,0.,0.,1.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1.,1.
*DLOAD, OP=NEW
```

```
 1, BX, 100.
 1, BY, 100.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, GRAV, 100.,1,1,0
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, P1, 100.
 1, P3, 100.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, P2, 100.
 1, P4, 100.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, HP4, 100., 5., 0.
 1, HP2, 100., 5., 0.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*DLOAD, OP=NEW
 1, HP1, 100., 5., 0.
 1, HP3, 100., 5., 0.
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS3, 8
*DLOAD, OP=NEW
*FLOW, OP=NEW
 1, Q1, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY,OP=NEW
 NALL, 1,2
 CORNERS4, 8
*FLOW, OP=NEW
 1, Q2, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
```

```
 CORNERS1, 8
*FLOW, OP=NEW
 1, Q3, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS2, 8
*FLOW, OP=NEW
 1, Q4, 14.7, 2.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS3, 8
*FLOW, OP=NEW
*DFLOW, OP=NEW
 1, S1, 3.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS4, 8
*DFLOW, OP=NEW
 1, S2, 3.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS1, 8
*DFLOW, OP=NEW
 1, S3, 3.E-5
*END STEP
*STEP
*SOILS,CONSOLIDATION
 1., 1.
*BOUNDARY, OP=NEW
 NALL, 1,2
 CORNERS2, 8
*DFLOW, OP=NEW
 1, S4, 3.E-5
*END STEP
```

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```
type('109.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS REACTIVE FLUID VOLUME FLUX OUTPUT TO MATLAB (RVF, RECORD KEY 109)
*NODE,NSET=ALL
 1    , 0.        , 0.        , 0.
 2    , 7.        , 0.        , 0.
 3    , 7.        , 0.        , -7.
 4    , 0.        , 0.        , -7.
 5    , 0.        , 7.        , 0.
 6    , 7.        , 7.        , 0.
 7    , 7.        , 7.        , -7.
 8    , 0.        , 7.        , -7.
*NSET,NSET=NS1
 1,4,5,8
*NSET,NSET=NS2
 1,2,3,4
*NSET,NSET=NS3
 1,2,5,6
*NSET,NSET=NS4
 2,3,7,6
*ELEMENT,TYPE=C3D8P, ELSET=EALL
 1,  1,2,3,4,5,6,7,8
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC
 3.E6,0.3
*DENSITY
 10.0,
*EXPANSION
 .0001,
*SPECIFIC HEAT
 1.0
*CONDUCTIVITY
 0.1
*DENSITY, PORE FLUID
 10.0,
*EXPANSION, PORE FLUID
 .0001,
*SPECIFIC HEAT, PORE FLUID
 1.0
*CONDUCTIVITY, PORE FLUID
 0.1
*PERMEABILITY, SPECIFIC=1.0
 0.01
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 ALL, 0.
*INITIAL CONDITIONS,TYPE=RATIO
 ALL,1.
*INITIAL CONDITIONS,TYPE=PORE
 ALL,0.
*BOUNDARY
 ALL,1,3
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
```

```
 1,BX,3000.
*FILE FORMAT, ASCII
*NODE FILE
 RVF
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,BY,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0, 1.0
*DLOAD, OP=NEW
 1,BZ,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,GRAV,300.0,1.0,0.0,0.0
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,CENT,300.,-1000.,3.5,-3.5,0.,1.,0.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,CENTRIF,30.,-1000,3.5,-3.5,0.,1.,0.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
```

```
 1.0,1.0
*DLOAD, OP=NEW
 1,P1,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P2,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P3,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P4,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P5,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P6,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
```

```
 1.0,1.0
*DLOAD, OP=NEW
 1,HP1,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP2,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP3,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP4,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP5,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP6,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
```

```
*TEMPERATURE
 ALL, 40.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
*NODE FILE
 RVF
*END STEP
*STEP
*SOILS
 1.0,1.0
*BOUNDARY,OP=NEW
 NS1,1
 NS2,2
 NS3,3
*TEMPERATURE
 ALL, 40.0
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
*NODE FILE
 RVF
*END STEP
*STEP
*SOILS
 1.0,1.0
*BOUNDARY,OP=NEW
 NS1,1
 NS2,2
 NS3,3
*TEMPERATURE
 NS1, 20.0
 NS4, 40.0
*BOUNDARY, OP=NEW
 ALL, 8, 8
*NODE FILE
 RVF
*END STEP
```

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```
type('110.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS REACTIVE FLUID TOTAL VOLUME OUTPUT TO MATLAB (RVT, RECORD KEY 110)
*NODE,NSET=ALL
 1    , 0.        , 0.        , 0.
 2    , 7.        , 0.        , 0.
 3    , 7.        , 0.        , -7.
 4    , 0.        , 0.        , -7.
 5    , 0.        , 7.        , 0.
 6    , 7.        , 7.        , 0.
 7    , 7.        , 7.        , -7.
 8    , 0.        , 7.        , -7.
*NSET,NSET=NS1
 1,4,5,8
*NSET,NSET=NS2
 1,2,3,4
*NSET,NSET=NS3
 1,2,5,6
*NSET,NSET=NS4
 2,3,7,6
*ELEMENT,TYPE=C3D8P, ELSET=EALL
 1,  1,2,3,4,5,6,7,8
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC
 3.E6,0.3
*DENSITY
 10.0,
*EXPANSION
 .0001,
*SPECIFIC HEAT
 1.0
*CONDUCTIVITY
 0.1
*DENSITY, PORE FLUID
 10.0,
*EXPANSION, PORE FLUID
 .0001,
*SPECIFIC HEAT, PORE FLUID
 1.0
*CONDUCTIVITY, PORE FLUID
 0.1
*PERMEABILITY, SPECIFIC=1.0
 0.01
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 ALL, 0.
*INITIAL CONDITIONS,TYPE=RATIO
 ALL,1.
*INITIAL CONDITIONS,TYPE=PORE
 ALL,0.
*BOUNDARY
 ALL,1,3
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
```

```
 1,BX,3000.
*FILE FORMAT, ASCII
*NODE FILE
 RVT
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,BY,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0, 1.0
*DLOAD, OP=NEW
 1,BZ,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,GRAV,300.0,1.0,0.0,0.0
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,CENT,300.,-1000.,3.5,-3.5,0.,1.,0.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,CENTRIF,30.,-1000,3.5,-3.5,0.,1.,0.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
```

```
 1.0,1.0
*DLOAD, OP=NEW
 1,P1,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P2,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P3,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P4,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P5,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,P6,3000.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
```

```
 1.0,1.0
*DLOAD, OP=NEW
 1,HP1,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP2,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP3,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP4,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP5,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
*DLOAD, OP=NEW
 1,HP6,3000.,0.,-7.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
 ALL, 11, 11
*END STEP
*STEP
*SOILS
 1.0,1.0
```

```
*TEMPERATURE
 ALL, 40.
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
*NODE FILE
 RVT
*END STEP
*STEP
*SOILS
 1.0,1.0
*BOUNDARY,OP=NEW
 NS1,1
 NS2,2
 NS3,3
*TEMPERATURE
 ALL, 40.0
*BOUNDARY, OP=NEW
 ALL, 1, 3,
 ALL, 8, 8
*NODE FILE
 RVT
*END STEP
*STEP
*SOILS
 1.0,1.0
*BOUNDARY,OP=NEW
 NS1,1
 NS2,2
 NS3,3
*TEMPERATURE
 NS1, 20.0
 NS4, 40.0
*BOUNDARY, OP=NEW
 ALL, 8, 8
*NODE FILE
 RVT
*END STEP
```

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```
type('119.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS ELECTRICAL REACTION CHARGE OUTPUT TO MATLAB (RCHG, RECORD KEY 119)
*NODE
 1, 0.0, 0.0, 0.0
 2, 2.0, 0.0, 0.0
 3, 2.0, 2.0, 0.0
 4, 0.0, 2.0, 0.0
 5, 0.0, 0.0, 1.0
 6, 2.0, 0.0, 1.0
 7, 2.0, 2.0, 1.0
 8, 0.0, 2.0, 1.0
*ELEMENT,TYPE=C3D8E, ELSET=EALL
 1, 1,2,3,4,5,6,7,8
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC,TYPE=ISOTROPIC
 30.0E6,0.3
*PIEZOELECTRIC,TYPE=S
 0.,0.,0.,0.,0.,0.,0.,0.
 0.,0.,0.,0.,0.,0.,0.,0.
 0.,0.
*DIELECTRIC,TYPE=ISO
 1.0E-3,
*BOUNDARY
 1,1,3
 2,2
 4,3
 5,1
 1,9
 2,9
 3,9
 4,9
*SURFACE, NAME=SIDE1485
 1,S6
*STEP,PERTURBATION
*STATIC
*DLOAD
 1, P1, 1000.0
 1, P2, 1000.0
 1, P3, 1000.0
 1, P4, 1000.0
 1, P5, 1000.0
 1, P6, 1000.0
*DECHARGE
 1, ES1, 1000.0
 1, ES2, 1000.0
 1, ES3, 1000.0
 1, ES4, 1000.0
 1, ES5, 1000.0
 1, ES6, 1000.0
*CLOAD
 2,1,  1500.00
 3,1,   500.00
 3,2,   500.00
 3,3, -1000.00
```

```
 4,1,   500.00
 4,2,  1500.00
 5,2,  -500.00
 5,3,  1000.00
 6,1,  -500.00
 6,2, -1500.00
 7,1, -1500.00
 7,2, -1500.00
 7,3, -1000.00
 8,1, -1500.00
 8,2,  -500.00
*CECHARGE
 1,,-2000.
 2,,-2000.
 3,,-2000.
 4,,-2000.
 5,,-1000.
 6,,-1000.
 7,,-1000.
 8,,-1000.
*FILE FORMAT, ASCII
*NODE FILE
 RCHG
*END STEP
```

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```
type('120.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS CONCENTRATED ELECTRICAL NODAL CHARGE OUTPUT TO MATLAB (CECHG, RECORD KEY
119)
*NODE
 1, 0.0, 0.0, 0.0
 2, 2.0, 0.0, 0.0
 3, 2.0, 2.0, 0.0
 4, 0.0, 2.0, 0.0
 5, 0.0, 0.0, 1.0
 6, 2.0, 0.0, 1.0
 7, 2.0, 2.0, 1.0
 8, 0.0, 2.0, 1.0
*ELEMENT,TYPE=C3D8E, ELSET=EALL
 1, 1,2,3,4,5,6,7,8
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC,TYPE=ISOTROPIC
 30.0E6,0.3
*PIEZOELECTRIC,TYPE=S
 0.,0.,0.,0.,0.,0.,0.,0.
 0.,0.,0.,0.,0.,0.,0.,0.
 0.,0.
*DIELECTRIC,TYPE=ISO
 1.0E-3,
*BOUNDARY
 1,1,3
 2,2
 4,3
 5,1
 1,9
 2,9
 3,9
 4,9
*SURFACE, NAME=SIDE1485
 1,S6
*STEP,PERTURBATION
*STATIC
*DLOAD
 1, P1, 1000.0
 1, P2, 1000.0
 1, P3, 1000.0
 1, P4, 1000.0
 1, P5, 1000.0
 1, P6, 1000.0
*DECHARGE
 1, ES1, 1000.0
 1, ES2, 1000.0
 1, ES3, 1000.0
 1, ES4, 1000.0
 1, ES5, 1000.0
 1, ES6, 1000.0
*CLOAD
 2,1,  1500.00
 3,1,   500.00
 3,2,   500.00
```

```
 3,3, -1000.00
 4,1,   500.00
 4,2,  1500.00
 5,2,  -500.00
 5,3,  1000.00
 6,1,  -500.00
 6,2, -1500.00
 7,1, -1500.00
 7,2, -1500.00
 7,3, -1000.00
 8,1, -1500.00
 8,2,  -500.00
*CECHARGE
 1,,-2000.
 2,,-2000.
 3,,-2000.
 4,,-2000.
 5,,-1000.
 6,,-1000.
 7,,-1000.
 8,,-1000.
*FILE FORMAT, ASCII
*NODE FILE
 CECHG
*END STEP
```

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```
type('136.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS FLUID CAVITY PRESSURE OUTPUT TO MATLAB (PCAV, RECORD KEY 136)
*RESTART, WRITE, FREQ=1
*NODE, NSET=CAV1NOD
 1, 1., 1., 1.
 2, 2., 1., 1.
 3, 2., 2., 1.
 4, 1., 2., 1.
 5, 1., 1., 0.
 6, 2., 1., 0.
 7, 2., 2., 0.
 8, 1., 2., 0.
*ELEMENT,TYPE=SFM3D4,ELSET=STRUCTURE
 1, 2, 3, 7, 6
 2, 3, 4, 8, 7
 3, 6, 7, 8, 5
*SURFACE SECTION, ELSET=STRUCTURE
*SURFACE,TYPE=ELEMENT,NAME=CAV1
 STRUCTURE, SPOS
*PHYSICAL CONSTANTS, ABSOLUTE ZERO = 0
*FLUID CAVITY, NAME=CAVITY1, BEHAVIOR=FLUID, SURFACE=CAV1, REFNODE=1
 1.0
*FLUID BEHAVIOR, NAME=FLUID
*FLUID DENSITY
 10.,
*ELEMENT, TYPE=SPRING1, ELSET=SPRINGX1
 21, 2
*SPRING, ELSET=SPRINGX1
 1,
 400.,
*ELEMENT, TYPE=SPRING1, ELSET=SPRINGY1
 42, 4
*SPRING, ELSET=SPRINGY1
 2,
 1.E-6,
*BOUNDARY
 2, 2, 3, 0.0
 3, 3, 3, 0.0
 4, 1, 1, 0.0
 4, 3, 3, 0.0
 5, 1, 3, 0.0
 6, 2, 3, 0.0
 7, 3, 3, 0.0
 8, 1, 1, 0.0
 8, 3, 3, 0.0
*EQUATION
 2,
 3, 1, 1.0, 2, 1, -1.0
 2,
 6, 1, 1.0, 2, 1, -1.0
 2,
 7, 1, 1.0, 2, 1, -1.0
 2,
 3, 2, 1.0, 4, 2, -1.0
 2,
```

```
 7, 2, 1.0, 4, 2, -1.0
 2,
 8, 2, 1.0, 4, 2, -1.0
*NSET,NSET=REFNODE
 1,
*STEP, NLGEOM
*STATIC
 .2, 1.
*CLOAD
 4, 2, -600.
*FILE FORMAT, ASCII
*NODE FILE
 PCAV
*END STEP
```

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```
type('137.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS FLUID CAVITY VOLUME OUTPUT TO MATLAB (CVOL, RECORD KEY 137)
*RESTART, WRITE, FREQ=1
*NODE, NSET=CAV1NOD
 1, 1., 1., 1.
 2, 2., 1., 1.
 3, 2., 2., 1.
 4, 1., 2., 1.
 5, 1., 1., 0.
 6, 2., 1., 0.
 7, 2., 2., 0.
 8, 1., 2., 0.
*ELEMENT,TYPE=SFM3D4,ELSET=STRUCTURE
 1, 2, 3, 7, 6
 2, 3, 4, 8, 7
 3, 6, 7, 8, 5
*SURFACE SECTION, ELSET=STRUCTURE
*SURFACE,TYPE=ELEMENT,NAME=CAV1
 STRUCTURE, SPOS
*PHYSICAL CONSTANTS, ABSOLUTE ZERO = 0
*FLUID CAVITY, NAME=CAVITY1, BEHAVIOR=FLUID, SURFACE=CAV1, REFNODE=1
 1.0
*FLUID BEHAVIOR, NAME=FLUID
*FLUID DENSITY
 10.,
*ELEMENT, TYPE=SPRING1, ELSET=SPRINGX1
 21, 2
*SPRING, ELSET=SPRINGX1
 1,
 400.,
*ELEMENT, TYPE=SPRING1, ELSET=SPRINGY1
 42, 4
*SPRING, ELSET=SPRINGY1
 2,
 1.E-6,
*BOUNDARY
 2, 2, 3, 0.0
 3, 3, 3, 0.0
 4, 1, 1, 0.0
 4, 3, 3, 0.0
 5, 1, 3, 0.0
 6, 2, 3, 0.0
 7, 3, 3, 0.0
 8, 1, 1, 0.0
 8, 3, 3, 0.0
*EQUATION
 2,
 3, 1, 1.0, 2, 1, -1.0
 2,
 6, 1, 1.0, 2, 1, -1.0
 2,
 7, 1, 1.0, 2, 1, -1.0
 2,
 3, 2, 1.0, 4, 2, -1.0
 2,
```

```
 7, 2, 1.0, 4, 2, -1.0
 2,
 8, 2, 1.0, 4, 2, -1.0
*NSET,NSET=REFNODE
 1,
*STEP, NLGEOM
*STATIC
 .2, 1.
*CLOAD
 4, 2, -600.
*FILE FORMAT, ASCII
*NODE FILE
 CVOL
*END STEP
```

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```
type('138.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS ELECTRICAL REACTION CURRENT OUTPUT TO MATLAB (RECUR, RECORD KEY 138)
*RESTART,WRITE
*NODE
 900000001,   0.0, 0.0
 900000010,   1.0, 0.0
*NGEN,NSET=NALL
 900000001,900000010
*NSET,NSET=EDGE1
 900000001
*NSET,NSET=EDGE2
 900000010
*ELEMENT,TYPE=DC1D2E, ELSET=EALL
 900000001,900000001,900000002
*ELGEN,ELSET=EALL
 900000001,9
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
 0.1,
*MATERIAL,NAME=A1
*CONDUCTIVITY
 45.0,
*ELECTRICAL CONDUCTIVITY
 6.58E6,
*JOULE HEAT FRACTION
 1.0,
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY
 EDGE1,  9, ,   0.0
 EDGE2,  9, ,   0.1
 EDGE2, 11, , 100.0
*FILE FORMAT, ASCII
*NODE FILE
 RECUR
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*BOUNDARY,OP=NEW
 NALL, 11, , 0.0
*END STEP
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY,OP=NEW
 EDGE1,  9, ,   0.0
 EDGE2, 11, , 100.0
*CECURRENT,OP=NEW
 EDGE2,  9, 6.58E4
*END STEP
```

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```
type('139.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS CONCENTRATED ELECTRICAL NODAL CURRENT OUTPUT TO MATLAB (CECUR, RECORD KEY
139)
*RESTART,WRITE
*NODE
 900000001,   0.0, 0.0
 900000010,   1.0, 0.0
*NGEN,NSET=NALL
 900000001,900000010
*NSET,NSET=EDGE1
 900000001
*NSET,NSET=EDGE2
 900000010
*ELEMENT,TYPE=DC1D2E, ELSET=EALL
 900000001,900000001,900000002
*ELGEN,ELSET=EALL
 900000001,9
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
 0.1,
*MATERIAL,NAME=A1
*CONDUCTIVITY
 45.0,
*ELECTRICAL CONDUCTIVITY
 6.58E6,
*JOULE HEAT FRACTION
 1.0,
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY
 EDGE1,  9, ,   0.0
 EDGE2,  9, ,   0.1
 EDGE2, 11, , 100.0
*FILE FORMAT, ASCII
*NODE FILE
 CECUR
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*BOUNDARY,OP=NEW
 NALL, 11, , 0.0
*END STEP
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY,OP=NEW
 EDGE1,  9, ,   0.0
 EDGE2, 11, , 100.0
*CECURRENT,OP=NEW
 EDGE2,  9, 6.58E4
*END STEP
```

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```
type('145.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS VISCOUS FORCES DUE TO STATIC STABILIZATION OUTPUT TO MATLAB (VF, RECORD KEY
145)
*NODE
 1,
 2,10.
 3,10.,5.,
 4,0.,5.,
*ELEMENT,TYPE=CPE4,ELSET=ONE
 1,1,2,3,4
*SOLID SECTION,ELSET=ONE,MATERIAL=SIMPLE
 1.,
*MATERIAL,NAME=SIMPLE
*HYPERFOAM,N=3,TEST DATA INPUT,POISSON=0.,MODULI=INSTANTANEOUS
*UNIAXIAL TEST DATA
 -39. ,   -.05
 -57. ,   -.10
 -66. ,   -.15
 -72. ,   -.20
 -78. ,   -.25
 -84. ,   -.30
 -90. ,   -.35
 -96. ,   -.40
 -102. ,   -.45
 -108. ,   -.50
 -115. ,   -.55
 -130. ,   -.60
 -150. ,   -.65
 -185. ,   -.70
 -260. ,   -.75
 -400. ,   -.80
*VISCOELASTIC,TIME=PRONY
 0.5,0.5,3.
*BOUNDARY
 1,1,2
 2,2,2
 4,1,1
*STEP,NLGEOM,INC=200
*VISCO,CETOL=.01,STABILIZE
 2.,10.,,10.,
*BOUNDARY
 3,1,1,2.
 2,1,1,2.
*FILE FORMAT, ASCII
*NODE FILE
 VF
*END STEP
```

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```
type('146.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS TOTAL FORCE OUTPUT TO MATLAB (TF, RECORD KEY 146)
*RESTART,WRITE
*NODE
 1,          0.,          0.
 2,          1.,          0.
 3,          0.,          1.
 4,          1.,          1.
 7,          0.,          2.
 8,          1.,          2.
*NODE,NSET=NREF
 1001,          0.,          0.
*ELEMENT, TYPE=CPE4R, ELSET=ECPE
 1,       1,       2,       4,       3
 2,       3,       4,       8,       7
*SOLID SECTION,ELSET=ECPE,MATERIAL=MAT
 1.0,
*MATERIAL,NAME=MAT
*ELASTIC
 2.1E11,0.3
*DENSITY
 7800.0,
*NSET, NSET=XSYMM
 1,       3,       7
*NSET, NSET=YSYMM
 1,       2
*NSET, NSET=NPULL
 7,       8
*SURFACE,NAME=SCPE
 1,S3
*PRE-TENSION SECTION, SURFACE=SCPE, NODE=1001
*STEP,NLGEOM
 PRE-TENSION SECTION BY TIGHTENING
*STATIC
 0.1,1.
*BOUNDARY
 XSYMM,1,,
 YSYMM,2,,
 NPULL,2,,
 NREF,1,,0.1
*END STEP
*STEP,NLGEOM,INC=500
 FURTHER LOADING FROM INITIAL TIGHTENED STATE
*STATIC
 0.1,1.
*BOUNDARY
 NPULL,2,,0.2
*FILE FORMAT, ASCII
*NODE FILE
 TF
*END STEP
```

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```
type('201.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS TEMPERATURE OUTPUT TO MATLAB (NT, RECORD KEY 201)
*RESTART,WRITE
*NODE
 900000001,   0.0, 0.0
 900000010,   1.0, 0.0
*NGEN,NSET=NALL
 900000001,900000010
*NSET,NSET=EDGE1
 900000001
*NSET,NSET=EDGE2
 900000010
*ELEMENT,TYPE=DC1D2E, ELSET=EALL
 900000001,900000001,900000002
*ELGEN,ELSET=EALL
 900000001,9
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
 0.1,
*MATERIAL,NAME=A1
*CONDUCTIVITY
 45.0,
*ELECTRICAL CONDUCTIVITY
 6.58E6,
*JOULE HEAT FRACTION
 1.0,
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY
 EDGE1,  9, ,   0.0
 EDGE2,  9, ,   0.1
 EDGE2, 11, , 100.0
*FILE FORMAT, ASCII
*NODE FILE
 NT
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*BOUNDARY,OP=NEW
 NALL, 11, , 0.0
*END STEP
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY,OP=NEW
 EDGE1,  9, ,   0.0
 EDGE2, 11, , 100.0
*CECURRENT,OP=NEW
 EDGE2,  9, 6.58E4
*END STEP
```

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```
type('204.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS RESIDUAL FLUX OUTPUT TO MATLAB (RFL, RECORD KEY 204)
*RESTART,WRITE
*NODE
 900000001,   0.0, 0.0
 900000010,   1.0, 0.0
*NGEN,NSET=NALL
 900000001,900000010
*NSET,NSET=EDGE1
 900000001
*NSET,NSET=EDGE2
 900000010
*ELEMENT,TYPE=DC1D2E, ELSET=EALL
 900000001,900000001,900000002
*ELGEN,ELSET=EALL
 900000001,9
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
 0.1,
*MATERIAL,NAME=A1
*CONDUCTIVITY
 45.0,
*ELECTRICAL CONDUCTIVITY
 6.58E6,
*JOULE HEAT FRACTION
 1.0,
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY
 EDGE1,  9, ,   0.0
 EDGE2,  9, ,   0.1
 EDGE2, 11, , 100.0
*FILE FORMAT, ASCII
*NODE FILE
 RFL
*END STEP
*STEP
*HEAT TRANSFER,STEADY STATE
*BOUNDARY,OP=NEW
 NALL, 11, , 0.0
*END STEP
*STEP
*COUPLED THERMAL-ELECTRICAL,STEADY STATE
*BOUNDARY,OP=NEW
 EDGE1,  9, ,   0.0
 EDGE2, 11, , 100.0
*CECURRENT,OP=NEW
 EDGE2,  9, 6.58E4
*END STEP
```

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```
type('206.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS CONCENTRATED FLUX OUTPUT TO MATLAB (CFL, RECORD KEY 206)
*NODE,NSET=ALL
 900000001,0,0,0
 900000002,1,0,0
 900000003,1,1,0
 900000004,0,1,0
 900000005,0,0,2
 900000006,1,0,2
 900000007,1,1,2
 900000008,0,1,2
*ELEMENT,TYPE=C3D8T, ELSET=EALL
 900000001,900000001,900000002,900000003,900000004,900000005,900000006,900000007,900000008
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC
 1.0,0.0
*EXPANSION
 0.0
*CONDUCTIVITY
 1.0
*DENSITY
 1.0
*SPECIFIC HEAT
 1.0
*ELEMENT,TYPE=HEATCAP,ELSET=CAP
 900000101,900000001
 900000102,900000002
 900000103,900000003
 900000104,900000004
 900000105,900000005
 900000106,900000006
 900000107,900000007
 900000108,900000008
*HEATCAP,ELSET=CAP
 0.125
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 ALL,100
*BOUNDARY
 ALL,1,3,0.0
*AMPLITUDE,NAME=CONSTANT_FILM,VALUE=ABSOLUTE
 0.,1.0,10.0,1.0
*STEP,INC=100
 COOL DOWN BY CONVECTION
*COUPLED TEMPERATURE-DISPLACEMENT,DELTMX=2.5
 0.025,10
*CFILM,FILM AMPLITUDE=CONSTANT_FILM
 900000001,0.25,20,.0
 900000002,0.25,20,.0
 900000003,0.25,20,.0
 900000004,0.25,20,.0
 900000005,0.25,20,.0
 900000006,0.25,20,.0
 900000007,0.25,20,.0
 900000008,0.25,20,.0
```

```
*FILE FORMAT, ASCII
*NODE FILE
 CFL
*ENDSTEP
*STEP,INC=100
 HEATED UP BY PRESCRIBED FLUX
*COUPLED TEMPERATURE-DISPLACEMENT,DELTMX=2.5
 0.25,10
*CFILM,OP=NEW
*CFLUX,OP=NEW
 900000001,11,3.0
 900000002,11,3.0
 900000003,11,3.0
 900000004,11,3.0
 900000005,11,3.0
 900000006,11,3.0
 900000007,11,3.0
 900000008,11,3.0
*END STEP
```

```
type('214.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS INTERNAL FLUX OUTPUT TO MATLAB (RFLE, RECORD KEY 214)
*NODE,NSET=ALL
 900000001,0,0,0
 900000002,1,0,0
 900000003,1,1,0
 900000004,0,1,0
 900000005,0,0,2
 900000006,1,0,2
 900000007,1,1,2
 900000008,0,1,2
*ELEMENT,TYPE=C3D8T, ELSET=EALL
 900000001,900000001,900000002,900000003,900000004,900000005,900000006,900000007,900000008
*SOLID SECTION,MATERIAL=A1, ELSET=EALL
*MATERIAL,NAME=A1
*ELASTIC
 1.0,0.0
*EXPANSION
 0.0
*CONDUCTIVITY
 1.0
*DENSITY
 1.0
*SPECIFIC HEAT
 1.0
*ELEMENT,TYPE=HEATCAP,ELSET=CAP
 900000101,900000001
 900000102,900000002
 900000103,900000003
 900000104,900000004
 900000105,900000005
 900000106,900000006
 900000107,900000007
 900000108,900000008
*HEATCAP,ELSET=CAP
 0.125
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 ALL,100
*BOUNDARY
 ALL,1,3,0.0
*AMPLITUDE,NAME=CONSTANT_FILM,VALUE=ABSOLUTE
 0.,1.0,10.0,1.0
*STEP,INC=100
 COOL DOWN BY CONVECTION
*COUPLED TEMPERATURE-DISPLACEMENT,DELTMX=2.5
 0.025,10
*CFILM,FILM AMPLITUDE=CONSTANT_FILM
 900000001,0.25,20,.0
 900000002,0.25,20,.0
 900000003,0.25,20,.0
 900000004,0.25,20,.0
 900000005,0.25,20,.0
 900000006,0.25,20,.0
 900000007,0.25,20,.0
 900000008,0.25,20,.0
```

```
*FILE FORMAT, ASCII
*NODE FILE
 RFLE
*ENDSTEP
*STEP,INC=100
 HEATED UP BY PRESCRIBED FLUX
*COUPLED TEMPERATURE-DISPLACEMENT,DELTMX=2.5
 0.25,10
*CFILM,OP=NEW
*CFLUX,OP=NEW
 900000001,11,3.0
 900000002,11,3.0
 900000003,11,3.0
 900000004,11,3.0
 900000005,11,3.0
 900000006,11,3.0
 900000007,11,3.0
 900000008,11,3.0
*END STEP
```

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```
type('221.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NORMALIZED CONCENTRATION OUTPUT TO MATLAB (NNC, RECORD KEY 221)
*NODE,NSET=ALL
 1, 0.
 2, 7.
 3, 7., 7.
 4, 0., 7.
*NSET,NSET=FIX1
 1,2
*NSET,NSET=FIX2
 2,3
*NSET,NSET=FIX3
 3,4
*NSET,NSET=FIX4
 1,4
*ELEMENT,TYPE=DC2D3, ELSET=EALL
 1,1,2,3
 2,1,3,4
*ORIENTATION,NAME=RECT
 1.0, 0.0, 0.0, 0.0, 1.0, 0.0
 1, 0.0
*SOLID SECTION,MATERIAL=A1, ELSET=EALL,ORIENT=RECT
*MATERIAL,NAME=A1
*DIFFUSIVITY,TYPE=ORTHO,LAW=GENERAL
 3.77E-5,7.54E-5,11.31E-5
*SOLUBILITY
 1.,
*BOUNDARY
 FIX1, 11
*STEP
*MASS DIFFUSION,STEADY STATE
*FILE FORMAT, ASCII
*NODE FILE
 NNC
*DFLUX,OP=NEW
 1, BF, .3
*END STEP
*STEP
*MASS DIFFUSION, STEADY STATE
*BOUNDARY,OP=NEW
 FIX3,11
*DFLUX,OP=NEW
 1, S1, .3
*END STEP
*STEP
*MASS DIFFUSION, STEADY STATE
*BOUNDARY,OP=NEW
 FIX4,11
*DFLUX,OP=NEW
 1, S2, .3
*NODE FILE
 NNC
*END STEP
*STEP
*MASS DIFFUSION, STEADY STATE
```

```
*BOUNDARY,OP=NEW
 FIX1,11
*DFLUX,OP=NEW
 2, S2, .3
*NODE FILE
 NNC
*END STEP
*STEP
*MASS DIFFUSION, STEADY STATE
*BOUNDARY,OP=NEW
 FIX2,11
*DFLUX,OP=NEW
 2, S3, .3
*END STEP
```

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```
type('237.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS MOTIONS (IN CAVITY RADIATION ANALYSIS) OUTPUT TO MATLAB (MOT, RECORD KEY
237)
*PHYSICAL CONSTANTS, STEFAN=5.669E-8,ABSOLUTE ZERO=0.0
*NODE
 1,0.,0.
 18,17.,0.
 421,0.,21.
 438,17.,21.
*NGEN,NSET=LHS
 1,421,20
*NGEN,NSET=RHS
 18,438,20
*NFILL,NSET=ALLN
 LHS,RHS,17
*NSET,NSET=LLHS,GEN
 1,401,40
 3,403,40
 5,405,40
 7,407,40
 9,409,40
 11,411,40
 13,413,40
 15,415,40
 17,417,40
*NSET,NSET=URHS,GEN
 22,422,40
 24,424,40
 26,426,40
 28,428,40
 30,430,40
 32,432,40
 34,434,40
 36,436,40
 38,438,40
*NSET,NSET=OUTN,GEN
 209,210
 229,230
*ELEMENT,TYPE=DC2D4,ELSET=CONDEL
 1,1,2,22,21
*ELGEN,ELSET=CONDEL
 1,9,2,1,11,40,10
*ELSET,ELSET=OUTEL,GEN
 55,55
*SOLID SECTION,ELSET=CONDEL,MATERIAL=ALUM
*MATERIAL,NAME=ALUM
*CONDUCTIVITY
 204.,
*DENSITY
 2707.,
*SPECIFIC HEAT
 896.,
*SURFACE,NAME=SALL,PROPERTY=PALL
 CONDEL,S1
 CONDEL,S2
```

```
 CONDEL,S3
 CONDEL,S4
*CAVITY DEFINITION,NAME=ARR2D,AMB=200.
 SALL,
*SURFACE PROPERTY,NAME=PALL
*EMISSIVITY
 0.7,
*INITIAL CONDITIONS,TYPE=TEMPERATURE
 ALLN,300.
*RESTART,WRITE,FREQ=10
*STEP,INC=20
*HEAT TRANSFER,STEADY STATE
 1.,1.
*BOUNDARY
 LLHS,11,,1000.
 URHS,11,,400.
*RADIATION VIEW,REFLECTION=NO
*FILE FORMAT, ASCII
*NODE FILE
 MOT
*VIEWFACTOR OUTPUT,CAVITY=ARR2D
*END STEP
```

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```
type('1900.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL DISPLACEMENT OUTPUT TO MATLAB (U, RECORD KEY 101)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,     360
 2,      720,     0
 3,      360,     360
 4,      360,     0
 5,      0,       360
 6,      0,       0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*EL FILE
 COORD
*END STEP
```

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```
type('1901.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL DISPLACEMENT OUTPUT TO MATLAB (U, RECORD KEY 101)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,      720,     360
 2,      720,     0
 3,      360,     360
 4,      360,     0
 5,      0,       360
 6,      0,       0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-1
*DYNAMIC
 1., 1., 1E-05, 1.
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*CLOAD
 _PICKEDSET21, 2, -100.
*FILE FORMAT, ASCII
*NODE FILE
 COORD
*END STEP
```

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```
type('1980.inp')
```

```
*HEADING
 VERIFICATION OF ABAQUS NODAL DISPLACEMENT OUTPUT TO MATLAB (U, RECORD KEY 101)
*PART, NAME=PART-5
*END PART
*ASSEMBLY, NAME=ASSEMBLY
*INSTANCE, NAME=PART-5-1, PART=PART-5
*NODE
 1,     720,    360
 2,     720,    0
 3,     360,    360
 4,     360,    0
 5,     0,      360
 6,     0,      0
*ELEMENT, TYPE=FRAME2D
 1, 5, 3
 2, 3, 1
 3, 6, 4
 4, 4, 2
 5, 3, 4
 6, 1, 2
 7, 5, 4
 8, 6, 3
 9, 3, 2
 10, 4, 1
*ELSET, ELSET=_PICKEDSET2_#1, INTERNAL
 1,
*ELSET, ELSET=_PICKEDSET2_#2, INTERNAL
 2,
*ELSET, ELSET=_PICKEDSET2_#3, INTERNAL
 3,
*ELSET, ELSET=_PICKEDSET2_#4, INTERNAL
 4,
*ELSET, ELSET=_PICKEDSET2_#5, INTERNAL
 5,
*ELSET, ELSET=_PICKEDSET2_#6, INTERNAL
 6,
*ELSET, ELSET=_PICKEDSET2_#7, INTERNAL
 7,
*ELSET, ELSET=_PICKEDSET2_#8, INTERNAL
 8,
*ELSET, ELSET=_PICKEDSET2_#9, INTERNAL
 9,
*ELSET, ELSET=_PICKEDSET2_#10, INTERNAL
 10,
*FRAME SECTION, ELSET=_PICKEDSET2_#1, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#2, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#3, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
```

```
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#4, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#5, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#6, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#7, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#8, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#9, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*FRAME SECTION, ELSET=_PICKEDSET2_#10, PINNED
 1, 1.6E-3, 0, 9E-4
 0.,0.,-1.
 1E4, 1E3
*ELEMENT,TYPE=MASS,ELSET=MASSES
 11,1
 12,2
 13,3
 14,4
 15,5
 16,6
*MASS, ELSET=MASSES
 1
*END INSTANCE
*NSET, NSET=_PICKEDSET21, INTERNAL, INSTANCE=PART-5-1
 2, 4
*NSET, NSET=_PICKEDSET22, INTERNAL, INSTANCE=PART-5-1
 5, 6
*END ASSEMBLY
*STEP, NAME=STEP-2, NLGEOM=YES, PERTURBATION
*FREQUENCY, EIGENSOLVER=LANCZOS, ACOUSTIC COUPLING=ON, NORMALIZATION=DISPLACEMENT
10, , , , ,
*BOUNDARY
 _PICKEDSET22, 1, 1
 _PICKEDSET22, 2, 2
*FILE FORMAT, ASCII
*EL FILE
 SF
*END STEP
```

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List of functions used for any element file output request

Details about the external functions used for obtaining results about any element file output request. See Element result types to view the possible element result types that can be obtained using Abaqus2Matlab toolbox.

Rec8: Coordinates

Rec10: Nodal Flux Caused By Heat

Rec11: Stress

Rec12: Stress Invariant

Rec13: Section Force And Moment

Rec14: Energy Density

Rec18: Pore Or Acoustic Pressure

Rec19: Energy (Summed over Element)

Rec21: Total Strain

Rec22: Plastic Strain

Rec23: Creep Strain (Including Swelling)

Rec24: Total Inelastic Strain

Rec25: Total Elastic Strain

Rec26: Unit Normal To Crack In Concrete

Rec27: Section Thickness

Rec28: Heat Flux Vector

Rec29: Section Strain And Curvature

Rec31: Concrete Failure

Rec32: Strain Jump At Nodes

Rec33: Film

Rec34: Radiation

Rec35: Saturation (Pore Pressure Analysis)

Rec38: Mass Concentration (Mass Diffusion Analysis)

Rec40: Gel (Pore Pressure Analysis)

Rec43: Total Fluid Volume Ratio

Rec61: Element Status

Rec83: Average Shell Section Stress

Rec88: Thermal Strain

Rec89: Logarithmic Strain

Rec90: Nominal Strain

Rec91: Mechanical Strain Rate

Rec97: Pore Fluid Effective Velocity Vector

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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List of functions used for any node file output request

Details about the external functions used for obtaining results about any node file output request. See Node result types to view the possible node result types that can be obtained using Abaqus2Matlab toolbox.

Rec101: Nodal Displacement

Rec102: Nodal Velocity

Rec103: Nodal Acceleration

Rec104: Nodal Reaction Force

Rec105: Electrical Potential

Rec106: Nodal Point Load

Rec107: Nodal Coordinate

Rec108: Pore Or Acoustic Pressure

Rec109: Reactive Fluid Volume Flux

Rec110: Reactive Fluid Total Volume

Rec119: Electrical Reaction Charge

Rec120: Concentrated Electrical Nodal Charge

Rec136: Fluid Cavity Pressure

Rec137: Fluid Cavity Volume

Rec138: Electrical Reaction Current

Rec139: Concentrated Electrical Nodal Current

Rec145: Viscous Forces Due To Static Stabilization

Rec146: Total Force

Rec201: Temperature

Rec204: Residual Flux

Rec206: Concentrated Flux

Rec214: Internal Flux

Rec221: Normalized Concentration (Mass Diffusion Analysis)

Rec237: Motions (In Cavity Radiation Analysis)

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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List of functions used for any file output request

Details about the external functions used for obtaining results about any file output request. See Analysis result types to view the possible analysis result types that can be obtained using Abaqus2Matlab toolbox.

Rec1900: Element definitions

Rec1980: Modal

Rec1901: Node definitions

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec8
```

```
ABAQUS coordinate output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec8(#Rec#)

Description
    Read coordinate output from the results (*.fil) file generated from
    the ABAQUS finite element software. The asterisk (*) is replaced by
    the name of the results file. The record key for coordinate output is
    8 (only in ABAQUS/Standard). See section "Results file output format"
    in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain coordinate results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        COORD
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 8 as follows:
        Column  1  –  First coordinate.
        Column  2  –  Etc.
        where #n# is the number of elements multiplied by the number of
        increments, and #m# is the number of coordinates of each element.
        If the results file does not contain the desired output, #out#
        will be an empty array
```

```
help Rec10
```

```
ABAQUS nodal flux caused by heat output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec10(#Rec#)

Description
    Read nodal flux (caused by heat) output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for nodal
    flux output is 10 (only in ABAQUS/Standard). See section "Results
    file output format" in ABAQUS Analysis User's manual for more
    details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain nodal flux results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        NFLUX
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 10 as follows:
        Column  1  –  Node number.
        Column  2  –  First flux component.
        Column  3  –  Etc.
        where #n# is the number of nodes and #m# is the number of nodal
        flux components of each element. If the results file does not
        contain the desired output, #out# will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec11
```

```
ABAQUS stress output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec11(#Rec#)

Description
    Read stress output from the results (*.fil) file generated from the
    ABAQUS finite element software. The asterisk (*) is replaced by the
    name of the results file. The record key for stress output is 11. See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain stress results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        S
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 11 as follows:
        Column  1  –  First stress component.
        Column  2  –  Second stress component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of stress components
        of each element. If the results file does not contain the desired
        output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec12
```

```
ABAQUS stress invariant output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec12(#Rec#)

Description
    Read stress invariant output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for stress invariant
    output is 12 (only in ABAQUS/Standard). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain stress invariant results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        SINV
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 7]) is a double array containing the attributes of
        the record key 12 as follows:
        Column  1  –  Mises stress.
        Column  2  –  Tresca stress.
        Column  3  –  Hydrostatic pressure.
        Column  4  –  Currently not used.
        Column  5  –  Currently not used.
        Column  6  –  Currently not used.
        Column  7  –  Third stress invariant.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments. If the results file does not contain the
        desired output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec13
```

```
ABAQUS section force and moment output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec13(#Rec#)

Description
    Read section force output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for section force
    output is 13. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain section force results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        SF
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 13 as follows:
        Column  1  –  First section force.
        Column  2  –  Second section force.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a description of which section forces are available
        for each beam or shell element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments, and
        #m# is the number of section force components of each element. If
        the results file does not contain the desired output, #out# will
        be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec14
```

```
ABAQUS energy density output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec14(#Rec#)

Description
    Read energy density output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for energy density
    output is 14. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain energy density results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        ENER
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 7]) is a double array containing the attributes of
        the record key 14 as follows:
        Column  1  –  Strain energy.
        Column  2  –  Plastic dissipation.
        Column  3  –  Creep dissipation.
        Column  4  –  Viscous dissipation.
        Column  5  –  Electrostatic energy.
        Column  6  –  Energy dissipated due to electrical conduction.
        Column  7  –  Damage dissipation.
        where #n# is the number of elements multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec18
```

```
ABAQUS pore or acoustic pressure output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec18(#Rec#)

Description
    Read pore or acoustic pressure output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for pore
    or acoustic pressure output is 18 (only in ABAQUS/Standard). See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain pore or acoustic pressure results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        POR
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 1]) is a double array containing the attributes of
        the record key 18 as follows:
        Column  1  –  Liquid pressure.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array
```



```
    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```


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```
help Rec19
```

```
ABAQUS energy (summed over element) output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec19(#Rec#)

Description
    Read energy (summed over element) output from the results (*.fil)
    file generated from the ABAQUS finite element software. The asterisk
    (*) is replaced by the name of the results file. The record key for
    energy (summed over element) output is 19. See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain energy (summed over element) results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        ELEN
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 10]) is a double array containing the attributes of
        the record key 19 as follows:
        Column  1  –  Kinetic energy.
        Column  2  –  Strain energy.
        Column  3  –  Plastic dissipation.
        Column  4  –  Creep dissipation.
        Column  5  –  Viscous dissipation, not including dissipation due
        to stabilization.
        Column  6  –  Static dissipation (due to stabilization).
        Column  7  –  Artificial strain energy.
        Column  8  –  Electrostatic energy.
        Column  9  –  Electrical energy dissipated in a conductor.
        Column  10  –  Damage dissipation.
        where #n# is the number of elements multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec21
```

```
ABAQUS total strain output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec21(#Rec#)

Description
    Read strain output from the results (*.fil) file generated from the
    ABAQUS finite element software. The asterisk (*) is replaced by the
    name of the results file. The record key for strain output is 21. See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        E
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 21 as follows:
        Column  1  –  First strain component.
        Column  2  –  Second strain component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a description of the components for a given element
        type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of strain components
        of each element. If the results file does not contain the desired
        output, #out# will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec22
```

```
ABAQUS plastic strain output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec22(#Rec#)

Description
    Read plastic strain output from the results (*.fil) file generated
    from the ABAQUS finite element software (ABAQUS/Explicit). The
    asterisk (*) is replaced by the name of the results file. The record
    key for plastic strain output is 22. See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain plastic strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        PE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 6]) is a double array containing the attributes of
        the record key 22 as follows:
        Column  1  –  First plastic strain component.
        Column  2  –  Second plastic strain component.
        Column  3  –  Etc; followed by the equivalent plastic strain,
        actively yielding flag (yes or no, A8 format), and magnitude of
        plastic strain in Abaqus/Standard; followed by “0.0, UNUSED, 0.0”
        in Abaqus/Explicit for consistency with the length of the
        Abaqus/Standard record.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments. If the results file does not contain the
        desired output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec23
```

```
ABAQUS creep strain (including swelling) output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec23(#Rec#)

Description
    Read creep strain output (including swelling) from the results
    (*.fil) file generated from the ABAQUS finite element software. The
    asterisk (*) is replaced by the name of the results file. The record
    key for creep strain output is 23 (only in ABAQUS/Standard). See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain creep strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        CE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 23 as follows:
        Column  1  –  First creep strain component.
        Column  2  –  Second creep strain component.
        Column  3  –  Etc; followed by the equivalent creep strain,
        volumetric swelling strain, and magnitude of creep strain.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of creep strain
        results of each element. If the results file does not contain the
        desired output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec24
```

```
ABAQUS total inelastic strain output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec24(#Rec#)

Description
    Read total inelastic strain output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for total
    inelastic strain output is 24 (only in ABAQUS/Standard). See section
    "Results file output format" in ABAQUS Analysis User's manual for
    more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain total inelastic strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        IE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 24 as follows:
        Column  1  –  First inelastic strain component.
        Column  2  –  Second inelastic strain component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of total inelastic
        strain components of each element. If the results file does not
        contain the desired output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec25
```

```
ABAQUS total elastic strain output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec25(#Rec#)

Description
    Read total elastic strain output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for total
    elastic strain output is 25 (only in ABAQUS/Standard). See section
    "Results file output format" in ABAQUS Analysis User's manual for
    more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain total elastic strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        EE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 25 as follows:
        Column  1  –  First elastic strain component.
        Column  2  –  Second elastic strain component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of total elastic
        strain components of each element. If the results file does not
        contain the desired output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec26
```

```
ABAQUS unit normal to crack in concrete output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec26(#Rec#)

Description
    Read unit normal to crack in concrete output from the results (*.fil)
    file generated from the ABAQUS finite element software. The asterisk
    (*) is replaced by the name of the results file. The record key for
    unit normal to crack in concrete output is 26. See section "Results
    file output format" in ABAQUS Analysis User's manual for more
    details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain unit normal to crack in concrete results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        CRACK
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 9]) is a double array containing the attributes of
        the record key 26 as follows:
        Column  1  –  11-component (if a 1D, 2D, or 3D analysis).
        Column  2  –  12-component (if a 2D or 3D analysis).
        Column  3  –  13-component (if a 3D analysis).
        Column  4  –  21-component (if a 2D or 3D analysis).
        Column  5  –  22-component (if a 2D or 3D analysis).
        Column  6  –  23-component (if a 3D analysis).
        Column  7  –  31-component (if a 3D analysis).
        Column  8  –  32-component (if a 3D analysis).
        Column  9  –  33-component (if a 3D analysis).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec27
```

```
ABAQUS section thickness output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec27(#Rec#)

Description
    Read section thickness output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for section thickness
    output is 27. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain section thickness results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        STH
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 1]) is a double array containing the attributes of
        the record key 27 as follows:
        Column  1  –  Current section thickness for membranes and
        finite-strain shells in Abaqus/Standard and for plane stress
        elements, membranes, and all shells in Abaqus/Explicit.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

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```
help Rec28
```

```
ABAQUS heat flux vector output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec28(#Rec#)

Description
    Read heat flux vector output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for heat flux vector
    output is 28. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain heat flux vector results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        HFL
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 28 as follows:
        Column  1  –  Magnitude.
        Column  2  –  First component.
        Column  3  –  Second component.
        Column  4  –  Etc.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments, and
        #m# is the number of heat flux vector components of each element.
        If the results file does not contain the desired output, #out#
        will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec29
```

```
ABAQUS section strain and curvature output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec29(#Rec#)

Description
    Read section strain and curvature output from the results (*.fil)
    file generated from the ABAQUS finite element software. The asterisk
    (*) is replaced by the name of the results file. The record key for
    section strain and curvature output is 29. See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain section strain and curvature results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        SE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 29 as follows:
        Column  1  –  First section strain.
        Column  2  –  Second section strain.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments, and
        #m# is the number of section strain and curvature components of
        each element. If the results file does not contain the desired
        output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec31
```

```
ABAQUS concrete failure output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec31(#Rec#)

Description
    Read concrete failure output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for concrete failure
    output is 31 (only in ABAQUS/Standard). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain concrete failure results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        CONF
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a cell array containing the attributes of
        the record key 31 as follows:
        Column  1  -  Serial number (increasing from 1 to #n#)
        Column  2  –  Summary of the state of a concrete material point.
        This is the number of cracks or –1 if the concrete has crushed.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array

__________________________________________________________________________
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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

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```
help Rec32
```

```
ABAQUS strain jump at nodes output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec32(#Rec#)

Description
    Read strain jump at nodes output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    strain jump at nodes output is 32 (only in ABAQUS/Standard). See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain strain jump at nodes results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        SJP
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 32 as follows:
        Column  1  –  First strain jump component.
        Column  2  –  Second strain jump component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of strain jump at
        nodes components of each element. If the results file does not
        contain the desired output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec33
```

```
ABAQUS film output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec33(#Rec#)

Description
    Read film output from the results (*.fil) file generated from the
    ABAQUS finite element software. The asterisk (*) is replaced by the
    name of the results file. The record key for film output is 33 (only
    in ABAQUS/Standard). See section "Results file output format" in
    ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain film results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        FILM
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 3]) is a cell array containing the attributes of
        the record key 33 as follows:
        Column  1  –  Type.
        Column  2  –  Sink temperature.
        Column  3  –  Film coefficient.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec34
```

```
ABAQUS radiation output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec34(#Rec#)

Description
    Read radiation output from the results (*.fil) file generated from
    the ABAQUS finite element software. The asterisk (*) is replaced by
    the name of the results file. The record key for radiation output is
    34 (only in ABAQUS/Standard). See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain radiation results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        RAD
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 3]) is a cell array containing the attributes of
        the record key 34 as follows:
        Column  1  –  Type.
        Column  2  –  Sink temperature.
        Column  3  –  Radiation constant.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array

__________________________________________________________________________
Copyright (c) 2016
    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

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```
help Rec35
```

```
ABAQUS saturation (pore pressure analysis) output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec35(#Rec#)

Description
    Read saturation (pore pressure analysis) output from the results
    (*.fil) file generated from the ABAQUS finite element software. The
    asterisk (*) is replaced by the name of the results file. The record
    key for saturation output is 35 (only in ABAQUS/Standard). See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain saturation results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        SAT
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 1]) is a double array containing the attributes of
        the record key 35 as follows:
        Column  1  –  Saturation.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec38
```

```
ABAQUS mass concentration (mass diffusion analysis) output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec38(#Rec#)

Description
    Read mass concentration (mass diffusion analysis) output from the
    results (*.fil) file generated from the ABAQUS finite element
    software. The asterisk (*) is replaced by the name of the results
    file. The record key for mass concentration output is 38 (only in
    ABAQUS/Standard). See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain mass concentration results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        CONC
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 1]) is a double array containing the attributes of
        the record key 38 as follows:
        Column  1  –  Concentration.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec40
```

```
ABAQUS gel (pore pressure analysis) output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec40(#Rec#)

Description
    Read gel (pore pressure analysis) output from the results (*.fil)
    file generated from the ABAQUS finite element software. The asterisk
    (*) is replaced by the name of the results file. The record key for
    gel output is 40 (only in ABAQUS/Standard). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain gel results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        GELVR
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 1]) is a double array containing the attributes of
        the record key 40 as follows:
        Column  1  –  Gel volume ratio.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec43
```

```
ABAQUS total fluid volume ratio output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec43(#Rec#)

Description
    Read total fluid volume ratio output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for total
    fluid volume ratio output is 43 (only in ABAQUS/Standard). See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain total fluid volume ratio results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        FLUVR
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 1]) is a double array containing the attributes of
        the record key 43 as follows:
        Column  1  –  Total fluid volume ratio.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments. If the
        results file does not contain the desired output, #out# will be
        an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec61
```

```
ABAQUS element status output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec61(#Rec#)

Description
    Read element status output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for element status
    output is 61 (only in ABAQUS/Explicit). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain element status results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        STATUS
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 1]) is a double array containing the attributes of
        the record key 61 as follows:
        Column  1  –  Status of element (shear failure model, tensile
        failure model, porous failure criterion, brittle failure model,
        Johnson-Cook plasticity model, and VUMAT). The status of an
        element is 1.0 if the element is active, 0.0 if the element is
        not.
        where #n# is the number of elements multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec83
```

```
ABAQUS average shell section stress output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec83(#Rec#)

Description
    Read average shell section stress output from the results (*.fil)
    file generated from the ABAQUS finite element software. The asterisk
    (*) is replaced by the name of the results file. The record key for
    average shell section stress output is 83 (only in ABAQUS/Standard).
    See section "Results file output format" in ABAQUS Analysis User's
    manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain average shell section stress results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        SSAVG
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 83 as follows:
        Column  1  –  First section stress.
        Column  2  –  Second section stress.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a description of which section stresses are available
        for each shell element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of increments, and
        #m# is the number of average shell section stress components of
        each element. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec88
```

```
ABAQUS thermal strain output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec88(#Rec#)

Description
    Read thermal strain output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for thermal strain
    output is 88 (only in ABAQUS/Standard). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain thermal strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        THE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 88 as follows:
        Column  1  –  First thermal strain component.
        Column  2  –  Second thermal strain component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of thermal strain
        components of each element. If the results file does not contain
        the desired output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec89
```

```
ABAQUS logarithmic strain output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec89(#Rec#)

Description
    Read logarithmic strain output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    logarithmic strain output is 89. See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain logarithmic strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        LE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 89 as follows:
        Column  1  –  First logarithmic strain component.
        Column  2  –  Second logarithmic strain component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of logarithmic strain
        components of each element. If the results file does not contain
        the desired output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec90
```

```
ABAQUS nominal strain output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec90(#Rec#)

Description
    Read nominal strain output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for nominal strain
    output is 90. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain nominal strain results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        NE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 90 as follows:
        Column  1  –  First nominal strain component.
        Column  2  –  Second nominal strain component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of nominal strain
        components of each element. If the results file does not contain
        the desired output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec91
```

```
ABAQUS mechanical strain rate output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec91(#Rec#)

Description
    Read mechanical strain rate output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    mechanical strain rate output is 91 (only in ABAQUS/Standard). See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain mechanical strain rate results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        ER
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 91 as follows:
        Column  1  –  First strain rate component.
        Column  2  –  Second strain rate component.
        Column  3  –  Etc. (See “Elements” in Abaqus Analysis User's
        Manual for a definition of the number and type of the components
        for the element type).
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of mechanical strain
        rate components of each element. If the results file does not
        contain the desired output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec97
```

```
ABAQUS pore fluid effective velocity vector output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec97(#Rec#)

Description
    Read pore fluid effective velocity vector output from the results
    (*.fil) file generated from the ABAQUS finite element software. The
    asterisk (*) is replaced by the name of the results file. The record
    key for pore fluid effective velocity vector output is 97 (only in
    ABAQUS/Standard). See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain pore fluid effective velocity vector results:
        ...
        *FILE FORMAT, ASCII
        *EL FILE
        FLVEL
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 97 as follows:
        Column  1  –  Magnitude.
        Column  2  –  First component.
        Column  3  –  Second component.
        Column  4  –  Etc.
        where #n# is the number of elements multiplied by the number of
        integration points multiplied by the number of section points
        (for shell, beam, or layered solid elements) multiplied by the
        number of increments, and #m# is the number of pore fluid
        effective velocity vector components of each element. If the
        results file does not contain the desired output, #out# will be
        an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

```
help Rec101
```

```
ABAQUS displacement output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec101(#Rec#)

Description
    Read displacement output from the results (*.fil) file generated from
    the ABAQUS finite element software. The asterisk (*) is replaced by
    the name of the results file. The record key for displacement output
    is 101. See section "Results file output format" in ABAQUS Analysis
    User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain displacement results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        U
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 101 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of displacement.
        Column  3  –  Second component of displacement.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of displacements per node. If
        the results file does not contain the desired output, #out# will
        be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec102
```

```
ABAQUS velocity output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec102(#Rec#)

Description
    Read velocity output from the results (*.fil) file generated from the
    ABAQUS finite element software. The asterisk (*) is replaced by the
    name of the results file. The record key for velocity output is 102.
    See section "Results file output format" in ABAQUS Analysis User's
    manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain velocity results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        V
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 102 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of velocity.
        Column  3  –  Second component of velocity.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of velocities per node. If the
        results file does not contain the desired output, #out# will be
        an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

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```
help Rec103
```

```
ABAQUS acceleration output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec103(#Rec#)

Description
    Read acceleration output from the results (*.fil) file generated from
    the ABAQUS finite element software. The asterisk (*) is replaced by
    the name of the results file. The record key for acceleration output
    is 103. See section "Results file output format" in ABAQUS Analysis
    User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain acceleration results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        A
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 103 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of acceleration.
        Column  3  –  Second component of acceleration.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of accelerations per node. If
        the results file does not contain the desired output, #out# will
        be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec104
```

```
ABAQUS reaction force output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec104(#Rec#)

Description
    Read reaction force output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for reaction force
    output is 104. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain reaction force results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        RF
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 104 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of reaction force.
        Column  3  –  Second component of reaction force.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of reaction forces per node.
        If the results file does not contain the desired output, #out#
        will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec105
```

```
ABAQUS electrical potential output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec105(#Rec#)

Description
    Read electrical potential output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    electrical potential output is 105. See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain electrical potential results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        EPOT
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 105 as follows:
        Column  1  –  Node number.
        Column  2  –  Magnitude.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

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George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec106
```

```
ABAQUS point loads, moments, fluxes output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec106(#Rec#)

Description
    Read point loads, moments, fluxes output from the results (*.fil)
    file generated from the ABAQUS finite element software. The asterisk
    (*) is replaced by the name of the results file. The record key for
    point loads, moments, fluxes output is 106. See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain point loads, moments, fluxes results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        CF
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 106 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of load or flux.
        Column  3  –  Second component of load or flux.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of loads or fluxes per node.
        If the results file does not contain the desired output, #out#
        will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec107
```

```
ABAQUS coordinate output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec107(#Rec#)

Description
    Read coordinate output from the results (*.fil) file generated from
    the ABAQUS finite element software. The asterisk (*) is replaced by
    the name of the results file. The record key for coordinate output is
    107. See section "Results file output format" in ABAQUS Analysis
    User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain coordinate results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        COORD
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 107 as follows:
        Column  1  –  Node number.
        Column  2  –  First coordinate.
        Column  3  –  Second coordinate.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of coordinates per node. If
        the results file does not contain the desired output, #out# will
        be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

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```
help Rec108
```

```
ABAQUS pore or acoustic pressure output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec108(#Rec#)

Description
    Read pore or acoustic pressure output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for pore
    or acoustic pressure output is 108. See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain pore or acoustic pressure results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        POR
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 108 as follows:
        Column  1  –  Node number.
        Column  2  –  Pressure.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

```
help Rec109
```

```
ABAQUS reactive fluid volume flux output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec109(#Rec#)

Description
    Read reactive fluid volume flux output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    reactive fluid volume flux output is 109 (only in ABAQUS/Standard).
    See section "Results file output format" in ABAQUS Analysis User's
    manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain reactive fluid volume flux results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        RVF
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 109 as follows:
        Column  1  –  Node number.
        Column  2  –  Reaction fluid volume flux.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec110
```

```
ABAQUS reactive fluid total volume output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec110(#Rec#)

Description
    Read reactive fluid total volume output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    reactive fluid total volume output is 110 (only in ABAQUS/Standard).
    See section "Results file output format" in ABAQUS Analysis User's
    manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain reactive fluid total volume results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        RVT
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 110 as follows:
        Column  1  –  Node number.
        Column  2  –  Reaction fluid total volume.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec119
```

```
ABAQUS electrical reaction charge output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec119(#Rec#)

Description
    Read electrical reaction charge output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    electrical reaction charge output is 119 (only in ABAQUS/Standard).
    See section "Results file output format" in ABAQUS Analysis User's
    manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain electrical reaction charge results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        RCHG
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 119 as follows:
        Column  1  –  Node number.
        Column  2  –  Charge scalar value.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec120
```

```
ABAQUS concentrated electrical nodal charge output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec120(#Rec#)

Description
    Read concentrated electrical nodal charge output from the results
    (*.fil) file generated from the ABAQUS finite element software. The
    asterisk (*) is replaced by the name of the results file. The record
    key for concentrated electrical nodal charge output is 120 (only in
    ABAQUS/Standard). See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain concentrated electrical nodal charge results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        CECHG
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 120 as follows:
        Column  1  –  Node number.
        Column  2  –  Current scalar value.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec136
```

```
ABAQUS fluid cavity pressure output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec136(#Rec#)

Description
    Read fluid cavity pressure output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for fluid
    cavity pressure output is 136. See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain fluid cavity pressure results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        PCAV
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 136 as follows:
        Column  1  –  Fluid cavity reference node number.
        Column  2  –  Pressure.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec137
```

```
ABAQUS fluid cavity volume output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec137(#Rec#)

Description
    Read fluid cavity volume output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for fluid
    cavity volume output is 137. See section "Results file output format"
    in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain fluid cavity volume results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        CVOL
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 137 as follows:
        Column  1  –  Fluid cavity reference node number.
        Column  2  –  Volume.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec138
```

```
ABAQUS electrical reaction current output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec138(#Rec#)

Description
    Read electrical reaction current output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    electrical reaction current output is 138. See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain electrical reaction current results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        RECUR
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 138 as follows:
        Column  1  –  Node number.
        Column  2  –  Electrical current.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

```
help Rec139
```

```
ABAQUS concentrated electrical nodal current output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec139(#Rec#)

Description
    Read concentrated electrical nodal current output from the results
    (*.fil) file generated from the ABAQUS finite element software. The
    asterisk (*) is replaced by the name of the results file. The record
    key for concentrated electrical nodal current output is 139. See
    section "Results file output format" in ABAQUS Analysis User's manual
    for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain concentrated electrical nodal current results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        CECUR
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 139 as follows:
        Column  1  –  Node number.
        Column  2  –  Electrical current.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec145
```

```
ABAQUS viscous forces due to static stabilization output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec145(#Rec#)

Description
    Read viscous forces due to static stabilization output from the
    results (*.fil) file generated from the ABAQUS finite element
    software. The asterisk (*) is replaced by the name of the results
    file. The record key for viscous forces due to static stabilization
    output is 145 (only in ABAQUS/Standard). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain viscous forces due to static stabilization results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        VF
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 145 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of viscous force.
        Column  3  –  Second component of viscous force.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of components of viscous force
        per node. If the results file does not contain the desired
        output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec146
```

```
ABAQUS total force output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec146(#Rec#)

Description
    Read total force output from the results (*.fil) file generated from
    the ABAQUS finite element software. The asterisk (*) is replaced by
    the name of the results file. The record key for total force output
    is 146 (only in ABAQUS/Standard). See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain total force results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        TF
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 146 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of total force.
        Column  3  –  Second component of total force.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of components of total forces
        per node. If the results file does not contain the desired
        output, #out# will be an empty array
```

George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec201
```

```
ABAQUS temperature output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec201(#Rec#)

Description
    Read temperature output from the results (*.fil) file generated from
    the ABAQUS finite element software. The asterisk (*) is replaced by
    the name of the results file. The record key for temperature output
    is 201. See section "Results file output format" in ABAQUS Analysis
    User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain temperature results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        NT
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 201 as follows:
        Column  1  –  Node number.
        Column  2  –  Temperature.
        Column  3  –  Etc (for heat shells)
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of temperatures per node. If
        the results file does not contain the desired output, #out# will
        be an empty array

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Copyright (c) 2016
    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

```
help Rec204
```

```
ABAQUS residual flux output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec204(#Rec#)

Description
    Read residual flux output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for residual flux
    output is 204. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain residual flux results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        RFL
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 204 as follows:
        Column  1  –  Node number.
        Column  2  –  Residual flux.
        Column  3  –  Etc (for heat shells).
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of residual fluxes per node.
        If the results file does not contain the desired output, #out#
        will be an empty array
```

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Copyright (c) 2016
    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec206
```

```
ABAQUS concentrated flux output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec206(#Rec#)

Description
    Read concentrated flux output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for concentrated flux
    output is 206 (only in ABAQUS/Standard). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain concentrated flux results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        CFL
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 206 as follows:
        Column  1  –  Node number.
        Column  2  –  Concentrated flux.
        Column  3  –  Etc (for heat shells)
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of concentrated fluxes per
        node. If the results file does not contain the desired output,
        #out# will be an empty array
```

```
help Rec214
```

```
ABAQUS internal flux output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec214(#Rec#)

Description
    Read internal flux output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for internal flux
    output is 214 (only in ABAQUS/Standard). See section "Results file
    output format" in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain internal flux results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        RFLE
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 214 as follows:
        Column  1  –  Node number.
        Column  2  –  Flux, excluding external flux.
        Column  3  –  Etc (for heat shells)
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of internal fluxes per node.
        If the results file does not contain the desired output, #out#
        will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec221
```

```
ABAQUS normalized concentration (mass diffusion analysis) output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec221(#Rec#)

Description
    Read normalized concentration output from the results (*.fil) file
    generated from the ABAQUS finite element software (mass diffusion
    analysis). The asterisk (*) is replaced by the name of the results
    file. The record key for normalized concentration output is 221 (only
    in ABAQUS/Standard). See section "Results file output format" in
    ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain normalized concentration results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        NNC
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 2]) is a double array containing the attributes of
        the record key 221 as follows:
        Column  1  –  Node number.
        Column  2  –  Concentration.
        where #n# is the number of nodes multiplied by the number of
        increments. If the results file does not contain the desired
        output, #out# will be an empty array
```



```
    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec237
```

```
ABAQUS motions (in cavity radiation analysis) output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec237(#Rec#)

Description
    Read motion output from the results (*.fil) file generated from the
    ABAQUS finite element software. The asterisk (*) is replaced by the
    name of the results file. The record key for motion output is 237
    (only in ABAQUS/Standard). See section "Results file output format"
    in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and to
    contain motion results:
        ...
        *FILE FORMAT, ASCII
        *NODE FILE
        MOT
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 237 as follows:
        Column  1  –  Node number.
        Column  2  –  First component of motion.
        Column  3  –  Second component of motion.
        Column  4  –  Etc
        where #n# is the number of nodes multiplied by the number of
        increments and #m#-1 is the number of components of motion per
        node. If the results file does not contain the desired output,
        #out# will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
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```
help Rec1900
```

```
ABAQUS element definition output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec1900(#Rec#)

Description
    Read element definition output from the results (*.fil) file
    generated from the ABAQUS finite element software. The asterisk (*)
    is replaced by the name of the results file. The record key for
    element definition output is 1900. See section "Results file output
    format" in ABAQUS Analysis User's manual for more details.
    The following option with parameter has to be specified in the ABAQUS
    input file for the results (*.fil) file to be created:
        ...
        *FILE FORMAT, ASCII
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a cell array containing the attributes of
        the record key 1900 as follows:
        Column  1  –  Element number.
        Column  2  –  Element type.
        Column  3  –  First node on the element.
        Column  4  –  Second node on the element.
        Column  5  –  etc.
        where #n# is the number of elements and #m#-2 is the number of
        nodes per element. If the results file does not contain the
        desired output, #out# will be an empty array

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    George Papazafeiropoulos
    Captain, Infrastructure Engineer, Hellenic Air Force
    Civil Engineer, M.Sc., Ph.D. candidate, NTUA
    Email: gpapazafeiropoulos@yahoo.gr
    Website: http://users.ntua.gr/gpapazaf/
```

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```
help Rec1901
```

```
ABAQUS node definition output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec1901(#Rec#)

Description
    Read node definition output from the results (*.fil) file generated
    from the ABAQUS finite element software. The asterisk (*) is replaced
    by the name of the results file. The record key for node definition
    output is 1901. See section "Results file output format" in ABAQUS
    Analysis User's manual for more details.
    The following option with parameter has to be specified in the ABAQUS
    input file for the results (*.fil) file to be created:
        ...
        *FILE FORMAT, ASCII
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x #m#]) is a double array containing the attributes of
        the record key 1901 as follows:
        Column  1  –  Node number.
        Column  2  –  First coordinate.
        Column  3  –  Second coordinate.
        Column  4  –  etc.
        where #n# is the number of nodes and #m#-1 is the number of
        coordinates per node. If the results file does not contain the
        desired output, #out# will be an empty array
```


George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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```
help Rec1980
```

```
ABAQUS modal output to MATLAB

Syntax
    #Rec# = Fil2str('*.fil');
    #out# = Rec1980(#Rec#)

Description
    Read modal output from the results (*.fil) file generated from the
    ABAQUS finite element software. The asterisk (*) is replaced by the
    name of the results file. The record key for modal output is 1980 (in
    ABAQUS/Standard) and is written once per eigenvalue in a natural
    frequency extraction step. See section "Results file output format"
    in ABAQUS Analysis User's manual for more details.
    The following options with parameters have to be specified in the
    ABAQUS input file for the results (*.fil) file to be created and
    contain frequency analysis results (#n# is the number of requested
    eigenvalues):
        ...
        *FREQUENCY
        #n#
        *FILE FORMAT, ASCII
        ...
    NOTE: The results file (*.fil) must be placed in the same directory
    with the MATLAB source files in order to be processed.

Input parameters
    #Rec# (string) is an one-row string containing the ASCII code of the
        ABAQUS results (*.fil) file. It is generated by the function
        Fil2str.m.

Output parameters
    #out# ([#n# x 16]) is a double array containing the attributes of the
        record key 1980 as follows:
        Column  1  –  Eigenvalue number.
        Column  2  –  Eigenvalue.
        Column  3  –  Generalized mass.
        Column  4  –  Composite damping.
        Column  5  –  Participation factor for degree of freedom 1.
        Column  6  –  Effective mass for degree of freedom 1.
        Column  7  –  Participation factor for degree of freedom 2.
        Column  8  –  Effective mass for degree of freedom 2.
        Column  9  –  Participation factor for degree of freedom 3.
        Column 10  –  Effective mass for degree of freedom 3.
        Column 11  –  Participation factor for degree of freedom 4.
        Column 12  –  Effective mass for degree of freedom 4.
        Column 13  –  Participation factor for degree of freedom 5.
        Column 14  –  Effective mass for degree of freedom 5.
        Column 15  –  Participation factor for degree of freedom 6.
        Column 16  –  Effective mass for degree of freedom 6.
        where #n# is the number of requested eigenvalues in the frequency
        extraction step. If the results file does not contain the desired
        output, #out# will be an empty array
```

```
George Papazafeiropoulos
Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/
```

List of verification results for the external functions

Verification examples published with Matlab for each external function used for obtaining Abaqus analysis results and included in Abaqus2Matlab toolbox.

Functions used to obtain element results

Rec8

Rec10, Rec11, Rec12, Rec13, Rec14, Rec18, Rec19

Rec21, Rec22, Rec23, Rec24, Rec25, Rec26, Rec27, Rec28, Rec29

Rec31, Rec32, Rec33, Rec34, Rec35, Rec38

Rec40, Rec43

Rec61

Rec83, Rec88, Rec89

Rec90, Rec91, Rec97

Functions used to obtain node results

Rec101, Rec102, Rec103, Rec104, Rec105, Rec106, Rec107, Rec108, Rec109

Rec110, Rec119

Rec120

Rec136, Rec137, Rec138, Rec139

Rec145, Rec146

Rec201, Rec204, Rec206

Rec214

Rec221

Rec237

Functions used to obtain analysis results

Rec1900, Rec1901

Rec1980

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA

Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

COORDINATE output from Abaqus to Matlab (Record key 8)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\8.inp'],[S(1:a(end)-1),'\8.inp'],'f')
```

Run the input file 8.inp with Abaqus

```
!abaqus job=8
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('8.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('8.fil');
```

Obtain the desired output data

```
out = Rec8(Rec)
```

```
out =

   1.0e+02 *

   4.360769653320313   0.760769500732422                   0
   6.439230346679688   0.760769500732422                   0
   4.360769653320313   2.839230346679688                   0
   6.439230346679688   2.839230346679688                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     4
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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NODAL FLUX CAUSED BY HEAT output from Abaqus to Matlab (Record key 10)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\10.inp'],[S(1:a(end)-1),'\10.inp'],'f')
```

Run the input file 10.inp with Abaqus

```
!abaqus job=10
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('10.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('10.fil');
```

Obtain the desired output data

```
out = Rec10(Rec)
```

NODAL FLUX CAUSED BY HEAT output from Abaqus to Matlab (Record key 10)

```
out =

   1.000000000000000  -0.048500001430511
  17.000000000000000  -0.029119996353984
   3.000000000000000   0.058485034853220
   9.000000000000000  -0.127960473299026
  10.000000000000000  -0.108089022338390
   2.000000000000000   0.255184441804886
   3.000000000000000  -0.000000000000000
  19.000000000000000  -0.054902918636799
   5.000000000000000   0.097150400280952
  11.000000000000000  -0.267037570476532
  12.000000000000000  -0.081905759871006
   4.000000000000000   0.306695848703384
   5.000000000000000   0.000000000000000
  21.000000000000000  -0.063215240836143
   7.000000000000000   0.105126842856407
  13.000000000000000  -0.362418949604034
  14.000000000000000  -0.050000000745058
   6.000000000000000   0.370507359504700
  15.000000000000000   0.039445508271456
  31.000000000000000   0.005924356169999
  17.000000000000000  -0.002872860524803
  23.000000000000000   0.208759233355522
  24.000000000000000  -0.247853830456734
  16.000000000000000  -0.003402418224141
  17.000000000000000   0.031992856413126
  33.000000000000000  -0.032483801245689
  19.000000000000000   0.038614153862000
  25.000000000000000  -0.026081252843142
  26.000000000000000  -0.148404344916344
  18.000000000000000   0.136362388730049
  19.000000000000000   0.016288762912154
  35.000000000000000  -0.036326427012682
  21.000000000000000   0.063215240836143
  27.000000000000000  -0.196038544178009
  28.000000000000000  -0.050000000745058
  20.000000000000000   0.202860966324806
  29.000000000000000  -0.047317001968622
  45.000000000000000  -0.014062790200114
  31.000000000000000  -0.089953348040581
  37.000000000000000  -0.039081498980522
  38.000000000000000  -0.292690008878708
  30.000000000000000   0.483104646205902
  31.000000000000000   0.084028989076614
  47.000000000000000  -0.017204625532031
  33.000000000000000   0.004040092229843
  39.000000000000000   0.043716173619032
  40.000000000000000  -0.179145336151123
  32.000000000000000   0.064564712345600
  33.000000000000000   0.028443709015846
  49.000000000000000  -0.017395514994860
  35.000000000000000   0.036326427012682
  41.000000000000000  -0.092680327594280
  42.000000000000000  -0.050000000745058
  34.000000000000000   0.095305703580379
  43.000000000000000   0.097071006894112
  59.000000000000000  -0.000000000000000
  45.000000000000000  -0.049560658633709
```

51.000000000000000	0.274339854717255
52.000000000000000	-0.316297590732575
44.000000000000000	-0.005552621092647
45.000000000000000	0.063623450696468
61.000000000000000	0.000000000000000
47.000000000000000	-0.015272597782314
53.000000000000000	0.114266656339169
54.000000000000000	-0.180672451853752
46.000000000000000	0.018054945394397
47.000000000000000	0.032477222383022
63.000000000000000	-0.000000000000000
49.000000000000000	0.017395514994860
55.000000000000000	-0.019454803317785
56.000000000000000	-0.050000000745058
48.000000000000000	0.019582062959671
1.000000000000000	-0.000000000000000
15.000000000000000	0.039445508271456
17.000000000000000	-0.031992856413126
8.000000000000000	0.061184454709291
16.000000000000000	-0.096597582101822
9.000000000000000	0.027960473671556
3.000000000000000	0.074651703238487
17.000000000000000	0.002872860524803
19.000000000000000	-0.016288762912154
10.000000000000000	0.008089023642242
18.000000000000000	-0.236362382769585
11.000000000000000	0.167037561535835
5.000000000000000	0.097150400280952
19.000000000000000	-0.038614153862000
21.000000000000000	-0.000000000000000
12.000000000000000	-0.018094239756465
20.000000000000000	-0.302860975265503
13.000000000000000	0.262418955564499
15.000000000000000	0.000000000000000
29.000000000000000	-0.047317001968622
31.000000000000000	-0.141951009631157
22.000000000000000	0.154379621148109
30.000000000000000	0.343647629022598
23.000000000000000	-0.308759242296219
17.000000000000000	0.029119996353984
31.000000000000000	0.089953348040581
33.000000000000000	-0.028443709015846
24.000000000000000	0.147853821516037
32.000000000000000	-0.164564713835716
25.000000000000000	-0.073918744921684
19.000000000000000	0.054902918636799
33.000000000000000	-0.004040092229843
35.000000000000000	0.000000000000000
26.000000000000000	0.048404339700937
34.000000000000000	-0.195305705070496
27.000000000000000	0.096038542687893
29.000000000000000	0.085959158837795
43.000000000000000	0.183030173182487
45.000000000000000	-0.063623450696468
36.000000000000000	-0.050000000745058
44.000000000000000	-0.094447381794453
37.000000000000000	-0.060918502509594
31.000000000000000	0.051997661590576
45.000000000000000	0.049560658633709
47.000000000000000	-0.032477222383022
38.000000000000000	0.192690014839172

```
   46.000000000000000  -0.118054941296578
   39.000000000000000  -0.143716171383858
   33.000000000000000   0.032483801245689
   47.000000000000000   0.015272597782314
   49.000000000000000  -0.000000000000000
   40.000000000000000   0.079145334661007
   48.000000000000000  -0.119582064449787
   41.000000000000000  -0.007319673895836
   43.000000000000000   0.000000000000000
   57.000000000000000   0.108182854950428
   59.000000000000000  -0.066574394702911
   50.000000000000000   0.382731407880783
   58.000000000000000  -0.050000000745058
   51.000000000000000  -0.374339848756790
   45.000000000000000   0.014062790200114
   59.000000000000000   0.066574394702911
   61.000000000000000  -0.032668113708496
   52.000000000000000   0.216297581791878
   60.000000000000000  -0.050000000745058
   53.000000000000000  -0.214266657829285
   47.000000000000000   0.017204625532031
   61.000000000000000   0.032668113708496
   63.000000000000000  -0.000000000000000
   54.000000000000000   0.080672457814217
   62.000000000000000  -0.050000000745058
   55.000000000000000  -0.080545194447041
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   144
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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STRESS output from Abaqus to Matlab (Record key 11)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\11.inp'],[S(1:a(end)-1),'\11.inp'],'f')
```

Run the input file 11.inp with Abaqus

```
!abaqus job=11
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('11.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('11.fil');
```

Obtain the desired output data

```
out = Rec11(Rec)
```

```
out =

   1.0e-03 *

  Columns 1 through 3

   0.950879300944507  -0.950879300944507  -0.000000000000000
  -0.950879300944507   0.950879300944507  -0.000000000000000
   0.950879300944507  -0.950879300944507  -0.000000000000000
  -0.950879300944507   0.950879300944507  -0.000000000000000

  Column 4

  -0.950879300944507
  -0.950879300944507
   0.950879300944507
   0.950879300944507
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     4
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     4
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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STRESS INVARIANT output from Abaqus to Matlab (Record key 12)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\12.inp'],[S(1:a(end)-1),'\12.inp'],'f')
```

Run the input file 12.inp with Abaqus

```
!abaqus job=12
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('12.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('12.fil');
```

Obtain the desired output data

```
out = Rec12(Rec)
```

```
out =

   1.0e+02 *

  Columns 1 through 3

   4.061555702785962   4.073403386134805  -1.414195909500122
   4.061555702785962   4.073403386134903  -1.414195909500122
   4.061555702785962   4.073403386134778  -1.414195909500122
   4.061555702785962   4.073403386134851  -1.414195909500122
   3.193311370303528   3.208366862915000  -1.414195963541667
   3.193311370303528   3.208366862915026  -1.414195963541667
   3.193311370303528   3.208366862914992  -1.414195963541667
   3.193311370303528   3.208366862915013  -1.414195963541667
   0.649397204551838   0.651516979540990  -0.198075229326884
   0.649397204551838   0.651516979540977  -0.198075229326884
   0.649397204551838   0.651516979541000  -0.198075229326884
   0.649397204551838   0.651516979540986  -0.198075229326884
   0.502761880957109   0.505496937966988  -0.198075227737427
   0.502761880957109   0.505496937966985  -0.198075227737427
   0.502761880957109   0.505496937966991  -0.198075227737427
   0.502761880957109   0.505496937966987  -0.198075227737427
   3.214688524285443   3.223693443690140  -1.167404429117838
   3.214688524285443   3.223693443690125  -1.167404429117838
   3.214688524285443   3.223693443690162  -1.167404429117838
   3.214688524285443   3.223693443690162  -1.167404429117838
   2.540939520207082   2.552322619903017  -1.167404403686523
   2.540939520207082   2.552322619903012  -1.167404403686523
   2.540939520207082   2.552322619903023  -1.167404403686523
   2.540939520207082   2.552322619903023  -1.167404403686523
   1.404670646180374   1.409399125427969  -0.411221001942952
   1.404670646180374   1.409399125427979  -0.411221001942952
   1.404670646180374   1.409399125427981  -0.411221001942952
   1.404670646180374   1.409399125427976  -0.411221001942952
   1.082715924005927   1.088843442654792  -0.411220995585124
   1.082715924005927   1.088843442654795  -0.411220995585124
   1.082715924005927   1.088843442654795  -0.411220995585124
   1.082715924005927   1.088843442654794  -0.411220995585124
   2.608740746304634   2.615707800050301  -0.992264410654704
   2.608740746304634   2.615707800050278  -0.992264410654704
   2.608740746304634   2.615707800050305  -0.992264410654704
   2.608740746304634   2.615707800050337  -0.992264410654704
   2.074591696863577   2.083345800031589  -0.992264429728190
   2.074591696863577   2.083345800031583  -0.992264429728190
   2.074591696863577   2.083345800031591  -0.992264429728190
   2.074591696863577   2.083345800031598  -0.992264429728190
   2.028851005816763   2.035826468696583  -0.576645317077637
   2.028851005816763   2.035826468696490  -0.576645317077637
   2.028851005816763   2.035826468696531  -0.576645317077637
   2.028851005816763   2.035826468696414  -0.576645317077637
   1.559040913914464   1.568107642383290  -0.576645304361979
   1.559040913914464   1.568107642383266  -0.576645304361979
   1.559040913914464   1.568107642383276  -0.576645304361979
   1.559040913914464   1.568107642383245  -0.576645304361979

  Columns 4 through 6

   0.048461459150465   0.072261424064630   4.121864845285271
   0.048461459150368   0.072261424064728   4.121864845285271
```

0.048461459150493	0.072261424064602	4.121864845285272
0.048461459150420	0.072261424064676	4.121864845285271
0.334631342102081	0.364958343505838	3.542998205017080
0.334631342102054	0.364958343505866	3.542998205017080
0.334631342102089	0.364958343505830	3.542998205017080
0.334631342102067	0.364958343505852	3.542998205017080
-0.020517268580997	-0.016256754398345	0.630999710959993
-0.020517268580984	-0.016256754398358	0.630999710959993
-0.020517268581007	-0.016256754398334	0.630999710959993
-0.020517268580993	-0.016256754398349	0.630999710959993
0.027737749945796	0.033253245353699	0.533234687912785
0.027737749945800	0.033253245353696	0.533234687912785
0.027737749945793	0.033253245353702	0.533234687912785
0.027737749945798	0.033253245353698	0.533234687912785
0.086811229509921	0.104897384643534	3.310504673200061
0.086811229509936	0.104897384643519	3.310504673200061
0.086811229509898	0.104897384643557	3.310504673200060
0.086811229509898	0.104897384643557	3.310504673200060
0.308989771133697	0.331911048889159	2.861312391036714
0.308989771133702	0.331911048889154	2.861312391036714
0.308989771133690	0.331911048889167	2.861312391036714
0.308989771133690	0.331911048889167	2.861312391036714
-0.061747106239680	-0.052241907119752	1.347652019188289
-0.061747106239690	-0.052241907119742	1.347652019188289
-0.061747106239692	-0.052241907119740	1.347652019188289
-0.061747106239687	-0.052241907119745	1.347652019188289
0.044152888429075	0.056513767242429	1.132996331083867
0.044152888429073	0.056513767242431	1.132996331083867
0.044152888429072	0.056513767242432	1.132996331083867
0.044152888429074	0.056513767242430	1.132996331083867
0.115698350836978	0.129688730239854	2.731406150887279
0.115698350837002	0.129688730239829	2.731406150887279
0.115698350836974	0.129688730239858	2.731406150887279
0.115698350836942	0.129688730239890	2.731406150887279
0.291942345803302	0.309562797546377	2.375288145834891
0.291942345803308	0.309562797546371	2.375288145834891
0.291942345803300	0.309562797546379	2.375288145834891
0.291942345803292	0.309562797546387	2.375288145834891
-0.106638047809636	-0.092614421844402	1.929188420886948
-0.106638047809542	-0.092614421844496	1.929188420886948
-0.106638047809583	-0.092614421844455	1.929188420886948
-0.106638047809465	-0.092614421844574	1.929188420886949
0.047844601049559	0.066139068603531	1.615952243432848
0.047844601049582	0.066139068603507	1.615952243432848
0.047844601049572	0.066139068603517	1.615952243432848
0.047844601049603	0.066139068603486	1.615952243432849

Column 7

4.061398802093875
4.061398802093872
4.061398802093875
4.061398802093873
3.192987327763640
3.192987327763639
3.192987327763640
3.192987327763640
0.649365757399281
0.649365757399281
0.649365757399281
0.649365757399281

```
    0.502693803753469
    0.502693803753469
    0.502693803753468
    0.502693803753469
    3.214574047534318
    3.214574047534319
    3.214574047534318
    3.214574047534318
    2.540706890829171
    2.540706890829171
    2.540706890829171
    2.540706890829171
    1.404598283172199
    1.404598283172199
    1.404598283172199
    1.404598283172199
    1.082557148796421
    1.082557148796421
    1.082557148796421
    1.082557148796421
    2.608656336919981
    2.608656336919982
    2.608656336919981
    2.608656336919981
    2.074423321160811
    2.074423321160811
    2.074423321160811
    2.074423321160811
    2.028741952251763
    2.028741952251766
    2.028741952251764
    2.028741952251768
    1.558799377199638
    1.558799377199640
    1.558799377199639
    1.558799377199641
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     7
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =
```

```
    48
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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SECTION FORCE AND MOMENT output from Abaqus to Matlab (Record key 13)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\13.inp'],[S(1:a(end)-1),'\13.inp'],'f')
```

Run the input file 13.inp with Abaqus

```
!abaqus job=13
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('13.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('13.fil');
```

Obtain the desired output data

```
out = Rec13(Rec)
```

```
out =

   1.0e+02 *

   0.842741609439195                  0                   0
   0.842741609439195                  0                   0
   0.842741609439195                  0                   0
  -0.084124955345573                  0                   0
  -0.084124955345573                  0                   0
  -0.084124955345573                  0                   0
  -0.954174320397057                  0                   0
  -0.954174320397057                  0                   0
  -0.954174320397057                  0                   0
  -0.226872803159978                  0                   0
  -0.226872803159978                  0                   0
  -0.226872803159978                  0                   0
   0.634215790714623                  0                   0
   0.634215790714623                  0                   0
   0.634215790714623                  0                   0
   0.720687318853162                  0                   0
   0.720687318853162                  0                   0
   0.720687318853162                  0                   0
   1.185553650967215                  0                   0
   1.185553650967215                  0                   0
   1.185553650967215                  0                   0
  -0.924162111088834                  0                   0
  -0.924162111088834                  0                   0
  -0.924162111088834                  0                   0
   0.550483937881905                  0                   0
   0.550483937881905                  0                   0
   0.550483937881905                  0                   0
  -0.028531262350788                  0                   0
  -0.028531262350788                  0                   0
  -0.028531262350788                  0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =
```

```
    30
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

ENERGY DENSITY output from Abaqus to Matlab (Record key 14)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\14.inp'],[S(1:a(end)-1),'\14.inp'],'f')
```

Run the input file 14.inp with Abaqus

```
!abaqus job=14
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('14.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('14.fil');
```

Obtain the desired output data

```
out = Rec14(Rec)
```

```
out =

  Columns 1 through 3

   0.008662066387139                   0   0.000000346476435
   0.008436692872570                   0   0.000000358512219
   0.011118877418720                   0   0.000001744920390
   0.010714100072232                   0   0.000001653152390
   0.012906600886137   0.000005643555081   0.000002873224831
   0.012565493762423                   0   0.000002822425869
   0.014436615464039   0.000201445505301   0.000002873390112
   0.014119144003692   0.000295594933179   0.000002873357676
   0.015283545714773   0.000101111754166   0.000002873472468
   0.015270587786840   0.000232885613953   0.000002873471251
   0.015289409873506                   0   0.000001858085180
   0.015520238942681                   0   0.000002056529615
   0.014526911488310                   0   0.000000785141168
   0.014983061228733                   0   0.000000877828317
   0.014039232778058                   0   0.000000294217714
   0.014746645669571                   0   0.000000324823825
   0.008151817627613                   0   0.000000359942329
   0.007622795958084                   0   0.000000388255454
   0.010117765395740                   0   0.000001488263968
   0.009025298371312                   0   0.000001238336115
   0.011992209575696                   0   0.000002758006519
   0.010727359852257                   0   0.000002466321308
   0.013786101479790   0.000420087170742   0.000002873322656
   0.013445139650920   0.000523952993078   0.000002873285688
   0.015035259094738   0.000402950471142   0.000002873448923
   0.013978808669858   0.000605886118738   0.000002873343047
   0.016218146607608                   0   0.000002461331510
   0.016452310300337   0.000294099309097   0.000002873577269
   0.015865342914899                   0   0.000001085467963
   0.018868755460263                   0   0.000001976831931
   0.015523921174698                   0   0.000000378905520
   0.018122138406134                   0   0.000000553181164
   0.007151183530640                   0   0.000000377416125
   0.006351133553599                   0   0.000000438896564
   0.008168818079575                   0   0.000000930916339
   0.007012746166660                   0   0.000000928100654
   0.009245977215137                   0   0.000001958830133
   0.007724758266147                   0   0.000001221749542
   0.011018914350838   0.001012601369928   0.000002872983011
   0.009248887712915                   0   0.000001877503392
   0.014036641158463   0.001169227856590   0.000002873349098
   0.011072731144826   0.000831417009638   0.000002872990624
   0.018610653109236   0.000474439598159   0.000002873748632
   0.011274068048821   0.004385464490521   0.000002873018688
   0.019371067065399   0.000608516048062   0.000002873803282
   0.022493939205441   0.004660215217683   0.000002874003039
   0.019810261726466                   0   0.000001823722758
   0.032839163596007   0.000884676119958   0.000002874480672
   0.005521973670357                   0   0.000000435634935
   0.004061202319419                   0   0.000000441124896
   0.005802399097277                   0   0.000000640473857
   0.003799487724337                   0   0.000000354474988
   0.006309718637572                   0   0.000000918114613
   0.003888776619110                   0   0.000000408610593
   0.007052986575914                   0   0.000001270118317
```

0.003828579148607	0	0.000000500924508
0.007609108790513	0	0.000001927369406
0.004304317645128	0	0.000000814362699
0.010805284824601	0.000412941626665	0.000002872952309
0.005584908489899	0	0.000001331735136
0.012570818162321	0.002061505797604	0.000002873185240
0.003256088786211	0	0.000001743202368
0.021762174297928	0.008164803498749	0.000002873959400
0.001096762983877	0	0.000000536479494
0.003072864351308	0	0.000000390276491
0.001987567672612	0	0.000000298447327
0.002589588414452	0	0.000000222222232
0.001605097109356	0	0.000000137704448
0.002468353713676	0	0.000000203920531
0.001344728480553	0	0.000000086155313
0.002418877379258	0	0.000000212035034
0.000989519174007	0	0.000000046593736
0.002296318834468	0	0.000000202599510
0.000895584911667	0	0.000000032477555
0.000702679004601	0	0.000000057937540
0.000631511084205	0	0.000000026923201
0.001124444789931	0	0.000000013317694
0.000246433916702	0	0.000000014562181
0.000323278916580	0	0.000000039622558
0.000013752059815	0	0.000000000771510
0.001395343204139	0	0.000000219297654
0.000848930117415	0	0.000000134515896
0.001033726420551	0	0.000000089418701
0.000657511009477	0	0.000000061205515
0.000900687639138	0	0.000000053225899
0.000525321397609	0	0.000000036418036
0.000761355536018	0	0.000000036050988
0.000368696134682	0	0.000000016580436
0.000469109496466	0	0.000000021427816
0.000256425662116	0	0.000000007897559
0.000253853334733	0	0.000000004513291
0.000115408261960	0	0.000000002491369
0.000075440547976	0	0.000000001225618
0.000042467809099	0	0.000000000850280
0.000024881774698	0	0.000000001598498
0.000008460886482	0	0.000000000441521
0.000553026056252	0	0.000000085237102
0.000298513155436	0	0.000000040880983
0.000421491542358	0	0.000000040354296
0.000238659728806	0	0.000000022682660
0.000351002654414	0	0.000000023985154
0.000193994265311	0	0.000000014204932
0.000240523936622	0	0.000000011165236
0.000135163760196	0	0.000000006978717
0.000170116819824	0	0.000000006023654
0.000092299814465	0	0.000000003462076
0.000077462117627	0	0.000000002262225
0.000043435974310	0	0.000000001112435
0.000025015112365	0	0.000000000298625
0.000014934677162	0	0.000000000243763
0.000002361252694	0	0.000000000096345
0.000000558911317	0	0.000000000008994
0.000182804994493	0	0.000000022126535
0.000092945086104	0	0.000000008541341
0.000152392356523	0	0.000000013605189
0.000080337926648	0	0.000000005929964

0.000124177143550	0	0.000000008629102
0.000065017429483	0	0.000000003920803
0.000087771957314	0	0.000000004327555
0.000044750505302	0	0.000000002003273
0.000058582490848	0	0.000000002283244
0.000030198448530	0	0.000000000959597
0.000027201614171	0	0.000000000626542
0.000014110007189	0	0.000000000269237
0.000010729782224	0	0.000000000151600
0.000006052019503	0	0.000000000081485
0.000000676740950	0	-0.000000000002193
0.000000953577819	0	-0.000000000002957
0.000061956811588	0	0.000000004688332
0.000049334506823	0	0.000000002438383
0.000054256255225	0	0.000000003338446
0.000033459772645	0	0.000000001330580
0.000044075788004	0	0.000000002124410
0.000019098233842	0	0.000000000558140
0.000028459091512	0	0.000000000997121
0.000012486888784	0	0.000000000183560
0.000018851337591	0	0.000000000500847
0.000006401203973	0	0.000000000069661
0.000009053965629	0	0.000000000170869
0.000003900262526	0	0.000000000017487
0.000003968699583	0	0.000000000035251
0.000001837280923	0	0.000000000009087
0.000000344534110	0	-0.000000000001157
0.000001138153390	0	0.000000000050921
0.000002913692982	0	0
0.000005494372727	0	0
0.000000044670552	0	0
0.000000029993658	0	0
0.000000248773715	0	0
0.000000791074510	0	0
0.000000038498487	0	0
0.000000034977147	0	0
0.000000838843343	0	0
0.000000180754241	0	0
0.000000039878253	0	0
0.000000040058051	0	0
0.000003123420080	0	0
0.000001568295987	0	0
0.000000039961877	0	0
0.000000037721749	0	0
0.027852841558440	0	0.000004635935220
0.026947663221963	0.000210494349007	0.000004653525069
0.036710382862379	0.006850945342872	0.000007040276161
0.034667938212612	0.006917365542488	0.000006888056144
0.042426471567324	0.011842842778251	0.000008600992713
0.040624628434183	0.011859357474196	0.000008528962768
0.047421992466541	0.012448363918537	0.000008600777434
0.045578923785861	0.012605300599928	0.000008602016931
0.049171517061753	0.009945903773052	0.000008610787783
0.047968353602590	0.010280830124619	0.000008610329528
0.047784394277723	0.003711703041683	0.000007219050862
0.050178196060943	0.004675433906405	0.000007498054717
0.046109123555525	0	0.000005055159033
0.047855000031339	0.000471753732287	0.000005686488032
0.046310884787038	0	0.000002243357691
0.048450282065933	0	0.000002656208813

0.025790570514499	0.000510134103013	0.000004645251357
0.024080412276294	0.001049676037356	0.000004676607246
0.032524668486760	0.006521852173246	0.000006625675019
0.027967618979216	0.006255802450106	0.000006182242330
0.037433264823075	0.011334586895055	0.000008435404351
0.031003724000441	0.010754612867160	0.000008011624055
0.042824392489422	0.013132520225979	0.000008599970906
0.042413565544823	0.012826123432458	0.000008605897270
0.047012690066678	0.011266030775763	0.000008608606188
0.042026767965147	0.012077559843349	0.000008608035704
0.051060754983327	0.007010880694387	0.000008056359527
0.045965753616969	0.011515102295739	0.000008594876716
0.050847217818314	0.001910666147131	0.000006038129565
0.062687431774800	0.006851149336699	0.000007377161512
0.051146720261134	0	0.000002720371737
0.059978077205475	0.000220636263487	0.000005070823702
0.022010799736120	0.001289738156907	0.000004634102782
0.020273605766638	0.001717941765169	0.000004765111051
0.025019912427771	0.004723384105818	0.000005657108037
0.020731255432686	0.003830235175924	0.000005649091865
0.027498143365061	0.007976070719699	0.000007278830434
0.022348245037556	0.003919445538458	0.000006134349759
0.029960809861007	0.015784462390852	0.000008582395002
0.026307799640073	0.006017212463857	0.000007148356606
0.041853349736776	0.016718355699733	0.000008595255854
0.031920981201663	0.014495474553312	0.000008584675102
0.061709834976387	0.012015247550826	0.000008607162477
0.025486364798792	0.035789730311504	0.000008584980391
0.053291097583887	0.015855830446735	0.000008568613128
0.063749770346033	0.040868422088789	0.000008553258146
0.047920884374708	0.008587535145016	0.000007105030010
0.108208243765448	0.017124908998363	0.000008554234745
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0.227656964466927	0.128030068338462	0.000035688591967
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0.247601831458467	0.077037363404392	0.000034443906642
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0.214021247223987	0.028093928139480	0.000032751479758
0.185384408058831	0.000185629493933	0.000025234958072
0.189527652423737	0.003411137163436	0.000029377605762
0.119416843095427	0.023629391147186	0.000031837803359
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ENERGY DENSITY output from Abaqus to Matlab (Record key 14)

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0.001551647789095	0	0.000001831430248
0.010369217173171	0.266298729800045	0.000047480766210
0.007667934078915	0.188394783214512	0.000046131567817
0.016442601554206	0.125744953737214	0.000044531224563
0.011717916302201	0.118328551377181	0.000043574623055
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0.009711679671833	0.074636236204736	0.000040923758112

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0.010947312969869	0.031723881183400	0.000033906466202
0.011879168696650	0.023574387573883	0.000034135420333
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0.001339273274192	0	0.000001675253407
0.003668098527317	0.141111971218813	0.000045504050619
0.004379570515372	0.086105543299821	0.000043459104191
0.006031115850957	0.102932157947446	0.000042856036692
0.006828789041878	0.072907084131619	0.000041149856187
0.011235999417816	0.071798425818559	0.000040656670240
0.004443122090257	0.051220648292863	0.000039546790256
0.010554570006082	0.043121729997721	0.000036909830852
0.009719649841710	0.032939889242463	0.000035888599754
0.011134587871293	0.022480729964385	0.000033225016932
0.012719462981955	0.016191209698772	0.000032110772816
0.011635663922577	0.006524311529586	0.000023985155396
0.010696824995617	0.004929697622187	0.000021474931003
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0.008534956147644	0	0.000013962512930
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0.005006403626530	0.021448102582838	0.000039048689258
0.010079124329127	0.033614273641170	0.000039316322579
0.006288029463911	0.001234505614737	0.000027677604715
0.008610586878926	0.017911376805053	0.000033264216541
0.004411167788540	0	0.000002164901985
0.010344442292825	0.006616069458746	0.000028382028835
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0.492661404159473	0.476573224702275	0.000078125834846
0.461176441202070	0.485667438853063	0.000078058064220
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0.395886145267853	0.219010492236748	0.000076430300546
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0.297046837579266	0.041097214268588	0.000074005915635
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0.377620284659680	0.363972238182984	0.000077845352763
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0.319560282234701	0.254594837720992	0.000078069346325
0.399663031859745	0.368147535456452	0.000078072288504
0.395124827425907	0.239771781528497	0.000078073884066
0.563904287736182	0.296388834132596	0.000077219194910
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0.163834563632163	0.208009555970501	0.000073937963344
0.183456206891975	0.331157076606519	0.000073812372068
0.193697520851469	0.411669653448261	0.000075129542457
0.124576321592389	0.536925881226110	0.000074944306727
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0.022100642608666	0.579815105442945	0.000073874339835
0.065595315836037	0.167575046795812	0.000072135638245
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0.006996351644656	0.106462365577982	0.000053249626584
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0.019798427351255	0.192805897714887	0.000067771649990
0.026640937653071	0.194861611683650	0.000065869003636
0.028981201583612	0.192040508732399	0.000065683099926
0.015413435915672	0.170510913826859	0.000063787899985
0.015753543091479	0.168968314455185	0.000064713793668
0.014068871790938	0.121397541003946	0.000058267953940
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0.012026447902872	0.107493822102025	0.000056667797835
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0.010773660986866	0.108110530125112	0.000059621268910
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0.011072428160460	0.023276251003735	0.000017249169649
0.004245255071971	0.094236291192371	0.000064040384014
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0.003543067624630	0.030082043882094	0.000061716369408
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0.015412502949881	0.027244171526292	0.000017835921104
0.020253213018707	0.018466842556594	0.000036485674208
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0.243939370908969	0.024692415760173	0.000097291440773
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0.369664267534236	0.259824968414510	0.000099305664608
0.476107511423064	0.516101355755758	0.000101117797628
0.309603323597660	0.561039686785331	0.000100966531901
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0.571056060973490	0.681218713010840	0.000101135903272
0.509535433238206	0.698916626568167	0.000101068174368
0.383035841190065	0.588159423818364	0.000100981046211
0.438543923125691	0.323577503475680	0.000099407280617
0.387491198877405	0.377056655451077	0.000099605231482
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0.503710345971548	0.152385662546614	0.000097435217699
0.315179956075380	0.000185629493933	0.000032994380965
0.308919736526282	0.010475995399002	0.000094699816719
0.191852014048459	0.094617432304107	0.000096778347210
0.363238767668442	0.178525005692049	0.000096717838856
0.268218069451490	0.380055966169466	0.000098990974531
0.264647286985991	0.542146538376977	0.000098599237566
0.428090102550388	0.520605927441395	0.000100810042079
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ENERGY DENSITY output from Abaqus to Matlab (Record key 14)

0.431679609068176	0.530140253568832	0.000101035119551
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0.307116488371364	0.311922769061768	0.000097314994981
0.830891180915201	0.502323023901301	0.000099522351573
0.209214103807079	0.051405831015954	0.000091941547955
1.152146936757706	0.116755689771755	0.000095961802051
0.168538371606997	0.282112212694533	0.000096932057655
0.187847765567525	0.466230824275510	0.000096799307169
0.210736099691229	0.572206481304615	0.000098124504557
0.142345953795242	0.790231176163993	0.000097916532697
0.238252646400164	0.512146403330958	0.000099766818466
0.149678621137443	0.719681482221403	0.000098367714401
0.207299881605562	0.386537253331580	0.000101165027272
0.130437185551314	0.565218763779778	0.000099514604592
0.162465214694964	0.348412989017779	0.000101152915492
0.195741826572342	0.732635675183114	0.000100933880880
1.029804138481330	0.431882327323994	0.000100770854463
0.045034591243568	1.117651212115430	0.000101247807095
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0.168933242857489	1.375347207502993	0.000100735759377
0.011530275880783	0.624180540721375	0.000097298852508
2.749004966303521	0.885075657257604	0.000098767218068
0.150983639445674	0.524957707860945	0.000096694385492
0.060467874965548	0.735974230454476	0.000097073623991
0.102994471188252	0.449506049502305	0.000097137989197
0.096393839684349	0.449559770602287	0.000096535035339
0.095828474545515	0.229396212881308	0.000097229367592
0.098174008577122	0.335723743182859	0.000096485495043
0.094134874587272	0.029667540480108	0.000098354949492
0.056251392186716	0.099815031750121	0.000096938857537
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0.047553535715770	0.424115147932011	0.000097722545625
0.080274879632375	0.645116428353646	0.000101075636100
0.080519240142379	0.690732215683535	0.000098221251002
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0.144097890833181	0.763522968382918	0.000096934733621
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0.070253739055474	0.322115827788485	0.000095079689587
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ENERGY DENSITY output from Abaqus to Matlab (Record key 14)

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ENERGY DENSITY output from Abaqus to Matlab (Record key 14)

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ENERGY DENSITY output from Abaqus to Matlab (Record key 14)

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ENERGY DENSITY output from Abaqus to Matlab (Record key 14)

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Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     7
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

        2240
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

```
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/
```

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PORE OR ACOUSTIC PRESSURE output from Abaqus to Matlab (Record key 18)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\18.inp'],[S(1:a(end)-1),'\18.inp'],'f')
```

Run the input file 18.inp with Abaqus

```
!abaqus job=18
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('18.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('18.fil');
```

Obtain the desired output data

```
out = Rec18(Rec)
```

```
out =

                   0
                   0
                   0
                   0
                   0
                   0
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                   0
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                   0
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                   0
  10.539567947387701
  10.539567947387701
   2.824068546295166
   2.824068546295166
   2.662693262100220
   9.937306404113770
   2.662693262100220
   9.937306404113770
   2.824068546295166
   2.824068546295166
  10.539567947387701
  10.539567947387701
   9.931544303894043
   2.661149263381958
   9.936950683593750
   2.662598133087158
 -11.830126762390140
 -11.830126762390140
  -3.169872999191284
  -3.169872999191284
  -1.901923775672913
  -7.098076343536377
  -1.901923775672913
  -7.098076343536377
  -3.169872999191284
  -3.169872999191284
 -11.830126762390140
 -11.830126762390140
  -7.098076343536377
```

```
  -1.901923775672913
  -7.098076343536377
  -1.901923775672913
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     1
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    60
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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ENERGY (SUMMED OVER ELEMENT) output from Abaqus to Matlab (Record key 19)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\19.inp'],[S(1:a(end)-1),'\19.inp'],'f')
```

Run the input file 19.inp with Abaqus

```
!abaqus job=19
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('19.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('19.fil');
```

Obtain the desired output data

```
out = Rec19(Rec)
```

```
out =

   1.0e+03 *

  Columns 1 through 3

                  0   0.007007712841034                   0
                  0   0.009725013732910   0.000090483121574
                  0   0.011045480728149   0.000060119524598
                  0   0.010493252754211                   0
                  0   0.006285181999207                   0
                  0   0.008991146087646   0.000169927224517
                  0   0.011103214263916   0.000234528467059
                  0   0.012308428764343                   0
                  0   0.005163098812103                   0
                  0   0.006702936649323   0.000182268247008
                  0   0.009898937225342   0.001234898805618
                  0   0.017012598037720   0.001107613325119
                  0   0.006906622409821                   0
                  0   0.007588821887970                   0
                  0   0.010189303398132   0.000148658990860
                  0   0.013926903724670   0.003681471347809
                  0   0.003331842422485                   0
                  0   0.002599732398987                   0
                  0   0.001629393815994                   0
                  0   0.000614847481251                   0
                  0   0.001416783928871                   0
                  0   0.000920181870461                   0
                  0   0.000394126832485                   0
                  0   0.000054450366646                   0
                  0   0.000653050303459                   0
                  0   0.000397735744715                   0
                  0   0.000165591955185                   0
                  0   0.000018519820645                   0
                  0   0.000274579405785                   0
                  0   0.000173727199435                   0
                  0   0.000070249982178                   0
                  0   0.000009942544624                   0
                  0   0.000107463963330                   0
                  0   0.000056224800646                   0
                  0   0.000020631656051                   0
                  0   0.000003935880493                   0
                  0   0.000047573547810                   0
                  0   0.000010388993658                   0
                  0   0.000010740129277                   0
                  0   0.000029072366655                   0
                  0   0.022712188720703   0.002516185045242
                  0   0.031689363479614   0.008776055335999
                  0   0.035118442535400   0.005150496959686
                  0   0.033970550537109   0.000084915675223
                  0   0.019865388870239   0.002580743551254
                  0   0.027661489486694   0.008648612022400
                  0   0.033491874694824   0.007536523342133
                  0   0.040438701629639   0.001616841316223
                  0   0.015846403121948   0.002081033945084
                  0   0.019100700378418   0.006065494537354
                  0   0.028974695205688   0.014223385810852
                  0   0.049170600891113   0.014838604927063
                  0   0.022072521209717   0.003167768478394
```

0	0.022894985198975	0.001497661113739
0	0.026988155364990	0.008162589073181
0	0.027138557434082	0.038313522338867
0	0.012490362167358	0.001217234134674
0	0.008979315757751	0
0	0.005774258613586	0
0	0.001796786189079	0
0	0.006445693016052	0.000158871844411
0	0.004044151306152	0
0	0.002020622014999	0
0	0.000649748742580	0
0	0.003504785299301	0
0	0.002279905557632	0
0	0.001216864466667	0
0	0.000433594793081	0
0	0.001848574519157	0
0	0.001296478629112	0
0	0.000687048673630	0
0	0.000261604666710	0
0	0.000946043908596	0
0	0.000541991531849	0
0	0.000250525504351	0
0	0.000076438069344	0
0	0.000483908444643	0
0	0.000115720883012	0
0	0.000100908756256	0
0	0.000273727118969	0
0	0.043034465789795	0.007144595623016
0	0.061784278869629	0.020886703491211
0	0.066082099914551	0.013885533332825
0	0.061370433807373	0.001232627391815
0	0.037816612243652	0.008889428138733
0	0.051510070800781	0.020102926254272
0	0.061428848266602	0.016866308212280
0	0.076202247619629	0.005593218326569
0	0.029304540634155	0.009686779975891
0	0.033217773437500	0.015314524650574
0	0.052555919647217	0.029385263442993
0	0.090274032592773	0.034423744201660
0	0.039627056121826	0.021853916168213
0	0.038744892120361	0.008614745140076
0	0.043982540130615	0.022533407211304
0	0.034698627471924	0.087885086059570
0	0.020518434524536	0.016719366073608
0	0.016791961669922	0.001359160423279
0	0.011053250312805	0.002361682653427
0	0.003420092821121	0
0	0.011722537994385	0.010862892150879
0	0.008853327751160	0
0	0.004483486652374	0
0	0.001997606158257	0
0	0.009206802368164	0.005679624080658
0	0.006072530746460	0
0	0.003370769262314	0
0	0.001512372612953	0
0	0.007614208698273	0.001057670474052
0	0.004630675315857	0
0	0.002369894981384	0
0	0.001032153725624	0
0	0.004324672698975	0
0	0.002289791107178	0

ENERGY (SUMMED OVER ELEMENT) output from Abaqus to Matlab (Record key 19)

0	0.001021031141281	0
0	0.000336534410715	0
0	0.002246702432632	0
0	0.000536722600460	0
0	0.000481138318777	0
0	0.001354880452156	0
0	0.073181297302246	0.014329703330994
0	0.110162345886231	0.047977130889893
0	0.113195480346680	0.034064891815186
0	0.097256340026855	0.003741232633591
0	0.066374862670898	0.021975278854370
0	0.085752593994141	0.043460437774658
0	0.101393295288086	0.036381774902344
0	0.130918334960937	0.014601787567139
0	0.049478580474854	0.029471940994263
0	0.052837070465088	0.035383312225342
0	0.086687896728516	0.056299854278564
0	0.154682861328125	0.074884330749512
0	0.065421249389648	0.070037216186523
0	0.059350803375244	0.021687015533447
0	0.062766021728516	0.050999000549316
0	0.041105072021484	0.174008392333984
0	0.032671588897705	0.063159248352051
0	0.025552097320557	0.011282677650452
0	0.017097110748291	0.015181514739990
0	0.005810056209564	0
0	0.016836370468140	0.053850643157959
0	0.014722582817078	0.005052084445953
0	0.007700469017029	0.000718319356441
0	0.003587032556534	0
0	0.012286350250244	0.049421840667725
0	0.012785814285278	0.001704181671143
0	0.007519980907440	0
0	0.002649571180344	0
0	0.011684410095215	0.036668888092041
0	0.013514932632446	0.001745854020119
0	0.006334414005280	0
0	0.001753099083900	0
0	0.013333853721619	0.011523633003235
0	0.008282175064087	0.000088282696903
0	0.002722901105881	0
0	0.000631942808628	0
0	0.013819134712219	0
0	0.002622174024582	0
0	0.003902857065201	0
0	0.010581642150879	0
0	0.109744003295898	0.025510232925415
0	0.172072586059570	0.103466995239258
0	0.172631652832031	0.075385276794434
0	0.139069442749023	0.007959031105042
0	0.103763412475586	0.048073055267334
0	0.125709129333496	0.086199348449707
0	0.149655838012695	0.075243438720703
0	0.205364364624023	0.033920051574707
0	0.073485176086426	0.075219024658203
0	0.077079254150391	0.076892723083496
0	0.131153228759766	0.104796775817871
0	0.249289337158203	0.154768966674805
0	0.093084114074707	0.168914321899414
0	0.082813972473145	0.046550964355469

0	0.078798820495605	0.113773857116699
0	0.048603130340576	0.331698455810547
0	0.049090816497803	0.157445281982422
0	0.036567417144775	0.035569869995117
0	0.022647602081299	0.059828075408936
0	0.008742463111877	0.008777790069580
0	0.026054792404175	0.148018554687500
0	0.020290277481079	0.038189682006836
0	0.011630986213684	0.009684234619141
0	0.004192782402039	0
0	0.015105060577393	0.146340087890625
0	0.017079391479492	0.026970972061157
0	0.014329119682312	0.002584301710129
0	0.003783453464508	0
0	0.011917495727539	0.108514671325684
0	0.018972370147705	0.036784641265869
0	0.016416414260864	0.002447829961777
0	0.003017740726471	0
0	0.015318923950195	0.048776832580566
0	0.015741285324097	0.009808267593384
0	0.008510187149048	0
0	0.001852666020393	0
0	0.057533878326416	0
0	0.011229522705078	0
0	0.019272609710693	0
0	0.056853851318359	0
0	0.153620117187500	0.043042518615723
0	0.243397476196289	0.200468093872070
0	0.241615631103516	0.148223052978516
0	0.193664855957031	0.015778617858887
0	0.148336715698242	0.094310096740723
0	0.171166305541992	0.156716171264648
0	0.209418762207031	0.144404922485352
0	0.303808349609375	0.071272994995117
0	0.100336936950684	0.159321472167969
0	0.107418632507324	0.153574890136719
0	0.187930572509766	0.194406463623047
0	0.385290527343750	0.295119354248047
0	0.120454032897949	0.333884857177734
0	0.108481040954590	0.089236679077148
0	0.093120285034180	0.253145339965820
0	0.060182102203369	0.619079589843750
0	0.070833526611328	0.316620941162109
0	0.051127353668213	0.090045845031738
0	0.029106313705444	0.174288116455078
0	0.013219036102295	0.056351856231689
0	0.039120903015137	0.305347229003906
0	0.027590810775757	0.119338409423828
0	0.016134532928467	0.059219436645508
0	0.005331366539001	0.000796512603760
0	0.019957393646240	0.301867340087891
0	0.021534727096558	0.108559425354004
0	0.018781595230103	0.027734182357788
0	0.007996410846710	0
0	0.011290089607239	0.217650650024414
0	0.019414804458618	0.107503578186035
0	0.024940731048584	0.027068012237549
0	0.011091609001160	0
0	0.016597518920898	0.100125610351563
0	0.015870010375977	0.028490484237671
0	0.016370698928833	0.003572677612305

0	0.010991364479065	0.000262480437756
0	0.165339508056641	0
0	0.035131908416748	0
0	0.059397815704346	0
0	0.194516540527344	0
0	0.190017227172852	0.064510383605957
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ENERGY (SUMMED OVER ELEMENT) output from Abaqus to Matlab (Record key 19)

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ENERGY (SUMMED OVER ELEMENT) output from Abaqus to Matlab (Record key 19)

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Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

    10
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   560
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

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TOTAL STRAIN output from Abaqus to Matlab (Record key 21)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\21.inp'],[S(1:a(end)-1),'\21.inp'],'f')
```

Run the input file 21.inp with Abaqus

```
!abaqus job=21
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('21.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('21.fil');
```

Obtain the desired output data

```
out = Rec21(Rec)
```

```
out =

  Columns 1 through 3

  -0.001178836505162  -0.001178836505162   0.004054708155500
  -0.001178836505162  -0.001178836505162   0.004054708155500
  -0.001178836505162  -0.001178836505162   0.004054708155500
  -0.001178836505161  -0.001178836505162   0.004054708155500
  -0.000798330531538  -0.000798330531538   0.003293696208253
  -0.000798330531538  -0.000798330531538   0.003293696208253
  -0.000798330531538  -0.000798330531538   0.003293696208253
  -0.000798330531538  -0.000798330531538   0.003293696208253
  -0.000199401482367  -0.000199401482367   0.000636493233331
  -0.000199401482367  -0.000199401482367   0.000636493233331
  -0.000199401482367  -0.000199401482367   0.000636493233330
  -0.000199401482367  -0.000199401482367   0.000636493233330
  -0.000135038481342  -0.000135038481342   0.000507767231281
  -0.000135038481342  -0.000135038481342   0.000507767231281
  -0.000135038481342  -0.000135038481342   0.000507767231280
  -0.000135038481342  -0.000135038481342   0.000507767231280
  -0.000914297394820  -0.000914297394820   0.003229480112434
  -0.000914297394820  -0.000914297394820   0.003229480112434
  -0.000914297394820  -0.000914297394820   0.003229480112434
  -0.000914297394820  -0.000914297394820   0.003229480112434
  -0.000619179608024  -0.000619179608024   0.002639244538842
  -0.000619179608024  -0.000619179608024   0.002639244538842
  -0.000619179608024  -0.000619179608024   0.002639244538842
  -0.000619179608024  -0.000619179608024   0.002639244538842
  -0.000438013373792  -0.000438013373792   0.001369491943362
  -0.000438013373793  -0.000438013373793   0.001369491943363
  -0.000438013373793  -0.000438013373793   0.001369491943363
  -0.000438013373793  -0.000438013373793   0.001369491943363
  -0.000296630998437  -0.000296630998437   0.001086727192652
  -0.000296630998437  -0.000296630998437   0.001086727192652
  -0.000296630998437  -0.000296630998437   0.001086727192652
  -0.000296630998437  -0.000296630998437   0.001086727192652
  -0.000724442615722  -0.000724442615722   0.002639602525633
  -0.000724442615723  -0.000724442615723   0.002639602525634
  -0.000724442615723  -0.000724442615723   0.002639602525634
  -0.000724442615723  -0.000724442615723   0.002639602525635
  -0.000490606335947  -0.000490606335947   0.002171929966084
  -0.000490606335948  -0.000490606335948   0.002171929966083
  -0.000490606335948  -0.000490606335947   0.002171929966084
  -0.000490606335947  -0.000490606335947   0.002171929966083
  -0.000639379537709  -0.000639379537710   0.001970733458995
  -0.000639379537709  -0.000639379537709   0.001970733458995
  -0.000639379537709  -0.000639379537710   0.001970733458995
  -0.000639379537709  -0.000639379537710   0.001970733458996
  -0.000432999999541  -0.000432999999541   0.001557974382659
  -0.000432999999541  -0.000432999999541   0.001557974382658
  -0.000432999999541  -0.000432999999541   0.001557974382659
  -0.000432999999541  -0.000432999999541   0.001557974382659

  Columns 4 through 6

   0.000000000000000  -0.000570758960435  -0.000570758960435
   0.000000000000000   0.000570758960436  -0.000570758960435
  -0.000000000000000  -0.000570758960435   0.000570758960436
  -0.000000000000000   0.000570758960436   0.000570758960436
```

```
    0.000000000000000  -0.000570758960436  -0.000570758960436
    0.000000000000000   0.000570758960435  -0.000570758960435
   -0.000000000000000  -0.000570758960435   0.000570758960435
   -0.000000000000000   0.000570758960436   0.000570758960436
   -0.000000000000000  -0.000096544501538  -0.000096544501537
   -0.000000000000000   0.000096544501537  -0.000096544501538
    0.000000000000000  -0.000096544501538   0.000096544501538
    0.000000000000000   0.000096544501537   0.000096544501538
   -0.000000000000000  -0.000096544501538  -0.000096544501538
   -0.000000000000000   0.000096544501538  -0.000096544501538
    0.000000000000000  -0.000096544501538   0.000096544501537
    0.000000000000000   0.000096544501537   0.000096544501538
    0.000000000000000  -0.000442676680194  -0.000442676680194
   -0.000000000000000   0.000442676680194  -0.000442676680194
    0.000000000000000  -0.000442676680194   0.000442676680194
   -0.000000000000000   0.000442676680194   0.000442676680194
    0.000000000000000  -0.000442676680194  -0.000442676680194
   -0.000000000000000   0.000442676680194  -0.000442676680193
    0.000000000000000  -0.000442676680194   0.000442676680193
   -0.000000000000000   0.000442676680194   0.000442676680195
    0.000000000000000  -0.000212073563033  -0.000212073563031
    0.000000000000000   0.000212073563033  -0.000212073563033
    0.000000000000000  -0.000212073563032   0.000212073563033
    0.000000000000000   0.000212073563034   0.000212073563033
    0.000000000000000  -0.000212073563032  -0.000212073563032
    0.000000000000000   0.000212073563033  -0.000212073563032
    0.000000000000000  -0.000212073563033   0.000212073563034
    0.000000000000000   0.000212073563033   0.000212073563033
    0.000000000000000  -0.000350754419665  -0.000350754419662
   -0.000000000000000   0.000350754419661  -0.000350754419662
    0.000000000000000  -0.000350754419662   0.000350754419662
   -0.000000000000000   0.000350754419662   0.000350754419663
    0.000000000000000  -0.000350754419663  -0.000350754419662
   -0.000000000000000   0.000350754419663  -0.000350754419662
    0.000000000000000  -0.000350754419665   0.000350754419662
   -0.000000000000000   0.000350754419661   0.000350754419663
   -0.000000000000000  -0.000309569307253  -0.000309569307252
   -0.000000000000000   0.000309569307253  -0.000309569307253
    0.000000000000000  -0.000309569307251   0.000309569307252
    0.000000000000000   0.000309569307252   0.000309569307252
   -0.000000000000000  -0.000309569307252  -0.000309569307253
   -0.000000000000000   0.000309569307253  -0.000309569307252
    0.000000000000000  -0.000309569307253   0.000309569307251
    0.000000000000000   0.000309569307253   0.000309569307253
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    48
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\22.inp'],[S(1:a(end)-1),'\22.inp'],'f')
```

Run the input file 22.inp with Abaqus

```
!abaqus job=22
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('22.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('22.fil');
```

Obtain the desired output data

```
out = Rec22(Rec)
```

```
out =

  Columns 1 through 3

                 0                  0                  0
                 0                  0                  0
                 0                  0                  0
                 0                  0                  0
  0.000000628563636  -0.000000548774861   0.000000331729011
                 0                  0                  0
  0.000022406385605  -0.000019606276343   0.000011888086160
  0.000033020817355  -0.000028516217692   0.000017048649437
  0.000011087665078  -0.000009894574898   0.000006179159882
  0.000025706895485  -0.000022651372747   0.000013924616944
                 0                  0                  0
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                 0                  0                  0
                 0                  0                  0
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                 0                  0                  0
  0.000047025022403  -0.000039942434624   0.000023548362798
  0.000057935166445  -0.000048358963813   0.000028628688745
  0.000044819557495  -0.000038766652946   0.000023327220457
  0.000067751388792  -0.000056707525386   0.000033134434208
                 0                  0                  0
  0.000032056950057  -0.000028443084901   0.000017828692071
                 0                  0                  0
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                 0                  0                  0
  0.000110481936166  -0.000084011075491   0.000047372406874
                 0                  0                  0
  0.000129485487938  -0.000103080797109   0.000058849593517
  0.000084832082029  -0.000064315354829   0.000040113633198
  0.000050959034215  -0.000045428184246   0.000029058118077
  0.000476523532784  -0.000292542208673   0.000135821725710
  0.000066628373111  -0.000059260561423   0.000036995141902
  0.000537981374284  -0.000388734515193   0.000190475556855
                 0                  0                  0
  0.000091987072584  -0.000087436206499   0.000059929926177
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0	0	0
0.000153105797579	-0.000090614587003	0.000087832119123
0	0	0
0.000450182369459	-0.000106458190390	0.000251486290454
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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

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0.007849674445835	-0.004174626178977	0.001044945729640
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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

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0.000327705742744	-0.000361119126948	0.000294252878227
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0.064631517815541	-0.033610840564236	0.002408339046110
0.054599974131613	-0.028293359557558	0.002043571709612
0.029485567390098	-0.016173270343754	0.002201908670876
0.033900243859747	-0.017934749412694	0.002039834170850
0.005781852287940	-0.004006754635298	0.001592895001902
0.013260364048887	-0.008206038244793	0.002270760832899
0.000007696569783	-0.000009725454574	0.000009058247853
0.000558012773743	-0.000619670578898	0.000517098361698
0.006932927572963	-0.003927435676592	0.001361691923578
0.009721184556494	-0.003264531962329	0.001980554744248
0.030692278125361	-0.014382654475022	0.001688329660900
0.038337589153492	-0.014105290027420	0.001703994667860
0.043583793023089	-0.020740272455794	0.002231942455411
0.045035733691563	-0.019460466871612	0.001434336862903
0.053750203271042	-0.027208704401556	0.001650735109896
0.033448044750629	-0.017102399019194	0.001848763814272
0.049327248520677	-0.025919250561669	0.002196820524376
0.032010477655512	-0.017462008027703	0.002255962331222
0.038572294942097	-0.020571208129591	0.002760387133959
0.051524614177635	-0.024692366392493	0.000550252488562
0.027493024648023	-0.013942275572432	0.001775750951452
0.045783855520885	-0.024863824931152	0.003118127516844
0.004209850090944	-0.002848505428212	0.001263026189432
0.009174186793067	-0.006564465364343	0.003009842972727
0.015296521388928	-0.003566383843087	0.001342952538204
0.015868054646074	0.004929166753451	0.001427792162988
0.037964724001446	-0.012514884474397	0.001538586943247
0.038429326656139	-0.000844925207912	0.001287447791689
0.038138794682723	-0.015069406018995	0.001615268541767
0.039325033107420	-0.004325095405237	0.001272493596228
0.028652278202401	-0.012177869211167	0.001546418949544
0.031642511434600	-0.005059510773971	0.001141406569038
0.030242414805816	-0.015075210739536	0.001223639746457
0.045826907038171	-0.011505550365848	0.001502292487396
0.041144253404785	-0.022880809060896	0.003475435181650
0.088259986096487	-0.035158054230246	0.000602103866237
0.075476981670345	-0.036524984517955	0.001390214833058
0.121222040624820	-0.057659519210992	0.001426556012675
0.050883725217819	-0.017990536587831	-0.000333779934662
0.064149282540022	-0.026770819960281	0.005533847107852
0.010583133754266	0.012597878384491	0.001307348048243
0.008864526924405	0.024311268597367	0.000777083118456
0.015158666414770	0.005847646130326	0.001043831719585
0.010279483657079	0.012050731055976	0.001051192406511
0.006303875653907	0.004484469848957	0.001018415423926

PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

0.002290468445668	0.014184748946554	0.001004325833826
0.000475332754983	-0.000035112191208	0.000660920999300
0.001939266965400	0.002233096021051	0.000763098005937
0.010482615680907	0.004620661356808	0.000896405472034
-0.002168241863526	0.023288604257150	0.000689239193385
0.036917245327893	-0.005953532127995	0.000947529302702
-0.021030709486816	0.055378232037101	0.000931010627334
0.030415238544636	0.015887630374348	0.001318648099986
-0.041768395863733	0.085613155764648	0.000233653024734
0.046281431048726	0.024128393299512	0.000058448336635
-0.014438878676463	0.043907272237381	-0.000064321022097
-0.000288050703747	0.034036404859721	0.001275221026879
-0.002639184101852	0.035337223693250	0.000550805238990
-0.003869438564400	0.021118082603448	0.000856923662901
-0.010145029828515	0.027827371645662	0.000576223520164
-0.004753401148788	0.018306391323353	0.000705293772389
-0.012798248673330	0.029828258171565	0.000849710537341
-0.001724664045230	0.006393118522258	0.000545513144778
-0.011945548897375	0.025787447697648	0.000539658354086
-0.010148280955544	0.028841054080487	0.000769424527248
-0.014999832347809	0.032107038756760	0.000379982166441
-0.031357818753939	0.064652407658685	0.000281544697302
-0.017223618585085	0.034667895366026	0.000398901724527
-0.018907779278865	0.040360939389543	0.000508498446230
-0.008732995871151	0.018227467523340	0.000170016614772
0.015925658362538	-0.007954369363226	0.000201201063757
0	0	0
-0.005701026193075	0.035503767528553	0.000676925780740
-0.006801886735540	0.029692401222658	0.000483920515810
-0.014126944468106	0.033593605251600	0.000795640513245
-0.018130027095332	0.037822450549125	0.000542327875503
-0.016566960680071	0.037018316891422	0.000449880905515
-0.019998630943723	0.040344605501471	0.000526238589987
-0.017457950173149	0.035136427595091	0.000556712411637
-0.018188337439245	0.036663621217398	0.000382761280650
-0.013691234197397	0.027399832717864	0.000371277725391
-0.012238674929619	0.024991860072391	0.000338738336901
-0.007570847978699	0.015480434268445	0.000188525597362
-0.003425719585070	0.006669750421615	0.000423394986019
-0.002832982545358	0.005687768947216	0.000273464234549
0	0	0
-0.000262910447057	0.000434410219648	0.000065908830105
0	0	0
-0.005046862189101	0.022526558063547	0.000449166791809
-0.003785958615060	0.015065405744313	0.000262152528272
-0.015760279123648	0.032527050295377	0.000461141163776
-0.010045974147897	0.020313218770169	0.000410465813480
-0.019048084862829	0.038193398754572	0.000455374710832
-0.012930080280350	0.026090102213244	0.000352390024954
-0.017644906861647	0.036119868462164	0.000407943664077
-0.014377518109457	0.030291625570275	0.000282309612185
-0.012486262647802	0.026480055653053	0.000332632419289
-0.012013172566917	0.025761045853852	0.000419132953863
-0.004593108022187	0.009967563624019	0.000232907443910
-0.009854206465220	0.020515927025265	0.000275269619852
-0.000926297601063	0.001531715161715	0.000243791623556
-0.006383445119934	0.012570761729433	0.000334692095296
0	0	0
0	0	0
-0.002191136376689	0.010283952990452	0.000126461261341

PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

-0.001450354914966	0.006397590881817	0.000131142365402
-0.006118911810679	0.013131726411592	0.000246436426843
-0.003174358461028	0.007363611519944	0.000200633652089
-0.007359920954610	0.014620804176223	0.000350418907689
-0.003176897406220	0.006507585162188	0.000123261467177
-0.009478661449915	0.019372533193804	0.000332904820537
-0.003408421011729	0.006510103458181	0.000354817957697
-0.010653846179632	0.022273727312766	0.000282831241075
-0.004825668382883	0.009678504064495	0.000226251393928
-0.010710003873753	0.022428021316798	0.000401036978556
-0.006503936663449	0.013211539469848	0.000353953614521
-0.009960496613886	0.020305371652645	0.000321722684717
-0.009240977144304	0.018497701096414	0.000458086784438
-0.005133509566605	0.010030315705737	0.000278722546694
-0.013230867483694	0.026505054983856	0.000307300050988
-0.000724244540547	0.004887340249250	-0.000138144545201
0.000352698393927	0.001418294466428	0.000437789397411
-0.001752261155365	0.005297768957122	0.000109240360907
-0.000128421435169	0.001275487093243	0.000088647834364
-0.001675331652169	0.003626052279414	0.000249860481153
-0.000011206347287	0.000047558497771	0.000033208905017
-0.001151860838513	0.002269225514627	0.000171006879620
0	0	0
-0.000935222711351	0.001519291544362	0.000257177138564
0	0	0
-0.002864507986269	0.005262141567911	0.000356540880185
-0.000351772813923	0.000502417484300	0.000142883683995
-0.005349216260205	0.010475387517512	0.000383446865108
-0.001348685708854	0.002462230423199	0.000229389148944
-0.010998552682991	0.022087932417279	0.000374784093314
-0.002969159142491	0.005756016218845	0.000580745611317
0.000377797082717	-0.000374472768919	0.000271022236286
0.001632169525088	-0.001400747004566	0.000939815456166
0.018558076221862	-0.010526879269252	0.001913608344839
0.025848770968976	-0.013376354176232	0.002119959147183
0.057828410777010	-0.030169901303408	0.002384637527180
0.061218653146136	-0.030118363451413	0.001749518269924
0.092005778154382	-0.046970437080016	0.002325219293880
0.079229507338193	-0.040986982136468	0.002678435941171
0.080109932405176	-0.041228798030453	0.002443872762707
0.067994349048343	-0.034780299409290	0.002034231463720
0.036601138364429	-0.019687258874674	0.002240987000769
0.041809578416406	-0.021706493657828	0.002014883237766
0.007598667202016	-0.004969562575969	0.001698703122963
0.016532613661177	-0.009907500310907	0.002411680648184
0.000007696569783	-0.000009725454574	0.000009058247853
0.000665590978337	-0.000726444148030	0.000597587421002
0.008412958438389	-0.004544466795613	0.001409427406707
0.011765069025489	-0.003503756522011	0.002099491489696
0.037741091887250	-0.017246812428734	0.001654140792172
0.047279231677981	-0.016831598305726	0.001705370452385
0.054164869598364	-0.025223605133068	0.002316626307213
0.056060699099761	-0.023680120357790	0.001434675013463
0.067055074509208	-0.033564766055882	0.001611541007246
0.041866971779094	-0.020950085315332	0.001808272504523
0.061705686285430	-0.031994118292028	0.002219272121475
0.040182567124997	-0.021564240903536	0.002371063279695
0.048200124534698	-0.025201728341037	0.002886946570016
0.064245509798466	-0.030502673002343	0.000346436961816
0.034110850984520	-0.016678279716974	0.001707100069102
0.056829775888685	-0.030379457333180	0.003269185521527

PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

0.005329179239052	-0.003265838390106	0.001291055635223
0.011365148330593	-0.007795417189372	0.003333985904181
0.018416279878231	-0.003977407421115	0.001335899003473
0.019248223825593	0.006728723775184	0.001425801140489
0.046503589313878	-0.015013495381154	0.001561468804014
0.047961016185910	-0.000062141969176	0.001322603539466
0.047156413468131	-0.018178406658132	0.001611327403117
0.049838100025171	-0.004730826825789	0.001268984793752
0.034576523754576	-0.014437950217710	0.001614718437392
0.039795425921441	-0.006101196147270	0.001100641531861
0.037353382350615	-0.018355048254894	0.001091883443546
0.057406259034182	-0.014015296001796	0.001548192813978
0.053119555631123	-0.028926679305569	0.003685585795364
0.110090030926270	-0.043998048976680	0.000527942488948
0.093955584654934	-0.044860047433937	0.001260574012110
0.148961935129400	-0.071094559952249	0.001502187337726
0.062116633385368	-0.019865669318504	-0.000335484577446
0.077906807239152	-0.030867044243369	0.005618151677110
0.012163215793595	0.016182509501294	0.001332877500697
0.010182164690133	0.030072494744724	0.000757360782400
0.017897797027504	0.008751279178253	0.001031606933215
0.012222689366039	0.017212613555338	0.001085129200788
0.007687165365439	0.006241400700337	0.001032784453936
0.003047121639803	0.018666276450899	0.000981185704302
0.000475332754983	-0.000035112191208	0.000660920999300
0.002644768518880	0.003008711493421	0.000786240072117
0.013180091579321	0.006391316090327	0.000891854256036
-0.002909916969495	0.030460349129880	0.000674565597882
0.046480589704387	-0.007006044928694	0.000974012087096
-0.027235827490969	0.071692274138480	0.000932686759029
0.037880641246314	0.019462035835827	0.001302463904522
-0.052272761710338	0.107106155999828	0.000237926995215
0.054691246040830	0.032320624009712	0.000067603231375
-0.017831638352604	0.053494708895058	-0.000064078301885
-0.001144069477476	0.042006245625540	0.001296439610776
-0.004087983093611	0.042773208952666	0.000576341957354
-0.005769117779609	0.029583176447616	0.000842311058755
-0.014271208357563	0.038807785473228	0.000570992721376
-0.006240425000279	0.024333867499239	0.000726337380923
-0.017230853456751	0.040419381971686	0.000855635040348
-0.002114571297784	0.008507940159037	0.000524472750059
-0.015478173466891	0.033840628883034	0.000539517305908
-0.013123100383332	0.037710902361709	0.000789728021850
-0.019325887609461	0.041689158705701	0.000376204403504
-0.040456524256128	0.083620496290793	0.000272113208620
-0.022250697620993	0.044951897491605	0.000407511715950
-0.024291882222361	0.052108541919035	0.000516123024278
-0.011330986848650	0.023830153337146	0.000160690698490
0.021823673360997	-0.010840020088823	0.000201456975041
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-0.007497366693310	0.042508966926477	0.000658582526158
-0.008746198762286	0.034743211141454	0.000503670509731
-0.019150201078330	0.045941120580545	0.000809104869112
-0.023917379292420	0.050038987123808	0.000551236402803
-0.022577396792492	0.050406354336190	0.000449582598339
-0.026908907084270	0.054552500656797	0.000521447771513
-0.023080293537135	0.046693097487388	0.000560329347763
-0.024504252642075	0.049626819051781	0.000390322514537
-0.017678457008169	0.035546388527422	0.000370616482018
-0.016453860540889	0.033770534066481	0.000329956201672

-0.009720126415049	0.019957136640871	0.000175495811998
-0.004613901361567	0.009197878352520	0.000453670323649
-0.003772416540691	0.007697584748237	0.000284393846621
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-0.000455132332090	0.000781447852752	0.000096425656238
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-0.005945455297654	0.024954882167517	0.000482625380118
-0.004042443407297	0.015812410798372	0.000265099879598
-0.020067805238114	0.041452289406158	0.000459489348558
-0.011801027382851	0.023879421124594	0.000420915624295
-0.025602338380616	0.051560179318087	0.000460309662301
-0.016744644624721	0.033972887175432	0.000365920660397
-0.024054706632542	0.049544446894108	0.000409005525754
-0.019423468685023	0.041198418773103	0.000269119273143
-0.017164080268325	0.036565854546369	0.000337103829389
-0.016690417052115	0.036227783261857	0.000443597334493
-0.006639481028217	0.014639556110381	0.000225109074923
-0.014459565921668	0.030402298457391	0.000245230931282
-0.001486462739385	0.002629764828532	0.000289033001132
-0.009428132077223	0.018771747198265	0.000351972717802
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0	0	0
-0.002261916337406	0.010501365190842	0.000137952698102
-0.001444298878244	0.006484213239100	0.000131979459341
-0.006776403990633	0.014451419077312	0.000267888045898
-0.003250335750609	0.007543425476340	0.000197103837912
-0.008733332664750	0.017474249398224	0.000348603630197
-0.003304663156722	0.006750079592443	0.000134725930809
-0.012399431274401	0.025484065732926	0.000343697387025
-0.004012220499922	0.007725117098154	0.000388826648372
-0.014715457106316	0.031085412106718	0.000272765545374
-0.006366257235336	0.013029688006944	0.000195194503577
-0.015364698097813	0.032660209544381	0.000417387585579
-0.008993097286403	0.018612819484879	0.000372568032450
-0.014618579699858	0.030084048595846	0.000304769616221
-0.013475802792515	0.027304406753216	0.000464492848563
-0.007675560472365	0.015198715554185	0.000292024177848
-0.019862814681447	0.040042931479660	0.000307596632287
-0.000761653471927	0.005053216113364	-0.000149257899357
0.000352740324363	0.001463898449904	0.000443453320003
-0.001757121692125	0.005309063967081	0.000109909718243
-0.000131550053732	0.001290710631132	0.000087214188225
-0.001735643653141	0.003768695940663	0.000246678628433
-0.000010630727952	0.000052476705220	0.000037142632401
-0.001263841276444	0.002513862981357	0.000162045958524
0	0	0
-0.001200286409547	0.002005640283531	0.000296980154053
0	0	0
-0.004000334141225	0.007550497202597	0.000374313612007
-0.000545215417683	0.000815316198404	0.000198457270227
-0.007668013190239	0.015267677731587	0.000413054971141
-0.001748882648426	0.003406586841838	0.000244967792648
-0.016431669111413	0.033310439641524	0.000363395834168
-0.004049057448744	0.008421756228845	0.000646095366168
0.000377797082717	-0.000374472768919	0.000271022236286
0.001843130861981	-0.001551666653637	0.001027726321345
0.021900154202055	-0.012162225106180	0.001933928675872
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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

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-0.036382449515433	0.074375982774273	0.000343480703788
-0.007681747687835	0.018483582495844	0.000720495464991

Columns 4 through 6

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0.000000350326497	0.000010208377106	1.000000000000000
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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

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0.000503535691459	0.000905834954433	1.000000000000000
0.000131079331357	0.001375623962790	1.000000000000000
0.000517133345937	0.001408540552379	1.000000000000000
0.000045688866442	0.001584805582850	1.000000000000000
0.000289089903954	0.001537620293408	1.000000000000000
0.000027868592697	0.001324967840267	1.000000000000000
0.000132524490145	0.001293559515855	1.000000000000000
-0.000016293182194	0.000614262045379	1.000000000000000
-0.000085902185594	0.000718365434278	1.000000000000000
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0.000020028778909	0.000191481926540	1.000000000000000
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0.000986109379525	0.000549281010169	1.000000000000000
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0.001430550375586	0.000864293318352	1.000000000000000
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0.001972141780368	0.001743655564028	1.000000000000000
0.001345773716853	0.000813755199331	1.000000000000000
0.001465970288195	0.001772133635438	1.000000000000000
0.002248996441257	0.001622074639354	1.000000000000000
0.000510470643594	0.001250418612206	1.000000000000000
0.005502241911888	0.003972778270985	1.000000000000000
0.000255344421315	0.001911571420474	1.000000000000000
0.004805199211182	0.004778174414240	1.000000000000000
-0.000212882815724	0.001258226291414	1.000000000000000

PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

-0.001051975664245	0.002142786797895	1.000000000000000
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0.001100061299807	0.000531742649538	1.000000000000000
0.000789390789159	0.000434330784050	1.000000000000000
0.000621702905226	0.000295334638966	1.000000000000000
0.000439463017089	0.000238267916611	1.000000000000000
0.000620649853044	0.000293338859995	1.000000000000000
0.000952075917130	0.000512274132170	1.000000000000000
0.001373582441296	0.000644907120995	1.000000000000000
0.002170465773931	0.001237121920691	1.000000000000000
0.001794442143125	0.000887552953694	1.000000000000000
0.006092194552286	0.003022158593619	1.000000000000000
0.002071106389677	0.001827239433086	1.000000000000000
0.013085987686949	0.006543887830561	1.000000000000000
-0.001661714006543	0.001769083604725	1.000000000000000
0.002366837147906	0.001105664823916	1.000000000000000
0.002266571912879	0.001067331577276	1.000000000000000
0.000524495749274	0.000247462759060	1.000000000000000
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0.001325802860557	0.003145420905089	1.000000000000000
0.000048751405282	0.003860893947843	1.000000000000000
0.000539305380148	0.003556789734651	1.000000000000000
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0.000131895640650	0.003032597943503	1.000000000000000
-0.000066379743317	0.001543925808700	1.000000000000000
-0.000375431975086	0.001782103066462	1.000000000000000
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0.001437201008551	0.000952820655380	1.000000000000000
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0.003562089021349	0.002668733956358	1.000000000000000
0.002111485810925	0.003013890038019	1.000000000000000
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0.001271641309579	0.003407696313933	1.000000000000000
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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

0.000441702543630	0.002893021605077	1.000000000000000
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-0.000308585628797	0.002061766665846	1.000000000000000
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-0.000277560255146	0.001161748318616	1.000000000000000
-0.000051274936845	0.002344747707443	1.000000000000000
0.000006724847122	0.000164334498010	1.000000000000000
0.000023487551921	0.000502689651651	1.000000000000000
0.002274059403731	0.001320330139209	1.000000000000000
0.003198170720234	0.001656811246941	1.000000000000000
0.004446777335412	0.002861988908454	1.000000000000000
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0.003847133411871	0.003284366457750	1.000000000000000
0.003369204866612	0.001920083777832	1.000000000000000
0.002628484592821	0.003210277030322	1.000000000000000
0.004847674493085	0.003292576957448	1.000000000000000
0.000872167808438	0.002393083223886	1.000000000000000
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-0.003460233445167	0.004817285096868	1.000000000000000
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0.000871594530160	0.000454316452619	1.000000000000000
0.001531085774243	0.000718767731350	1.000000000000000
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0.003389978633123	0.001604621180130	1.000000000000000
0.004481494088560	0.002492568242098	1.000000000000000
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0.022648578475899	0.011385058609338	1.000000000000000
-0.004863185890537	0.004024882259434	1.000000000000000
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0.044048000340847	0.066216227169259	1.000000000000000
-0.036018936759292	0.037260219596257	1.000000000000000
-0.010233300725588	0.056964883484712	1.000000000000000
-0.008023960307841	0.006938723023049	1.000000000000000
-0.010095739467994	0.013216233579868	1.000000000000000
0.054333742949947	0.029125120739342	1.000000000000000
0.109458850983681	0.052357849847346	1.000000000000000
0.102124186472858	0.062325022671224	1.000000000000000
0.195697547562875	0.097823204517740	1.000000000000000
0.085485408474165	0.058374154611254	1.000000000000000
0.179757194493185	0.092643786433945	1.000000000000000
0.054977476495300	0.040037042822602	1.000000000000000
0.127693763722543	0.067598221271637	1.000000000000000
0.024041012569745	0.038283224318248	1.000000000000000
0.155518981885859	0.087589249059563	1.000000000000000
0.002912739862253	0.056196911603478	1.000000000000000
0.163030205958007	0.128363506075775	1.000000000000000
-0.070363490346588	0.097674795609249	1.000000000000000
0.086461205370879	0.149506660384297	1.000000000000000
-0.078126855540833	0.084007431453845	1.000000000000000
-0.152657607604626	0.099734850329418	1.000000000000000
0.116281418776037	0.055382702077401	1.000000000000000
0.158572395560876	0.076436167377711	1.000000000000000
0.113026346877331	0.054062329792581	1.000000000000000
0.131282289309560	0.062711919579143	1.000000000000000
0.060634064280285	0.028836763076604	1.000000000000000
0.094186898137017	0.045878364367624	1.000000000000000
0.003145498617398	0.001524754074760	0
0.028961821685494	0.013651627496257	1.000000000000000
0.086131097249880	0.041017030256307	1.000000000000000
0.109820853639885	0.057055882648928	1.000000000000000
0.152025036076471	0.080191630430967	1.000000000000000
0.126867116611606	0.091300986326423	1.000000000000000
0.234520397221259	0.111785960688765	1.000000000000000
0.020913594451940	0.106682288943032	1.000000000000000
0.347652725469371	0.166551843310567	1.000000000000000
-0.097638896613286	0.065665034550058	1.000000000000000
0.153348746033284	0.078271469900509	1.000000000000000
0.134651037832992	0.071047920445110	1.000000000000000
0.095438513386475	0.052751460248635	1.000000000000000
0.077014009608248	0.054062684854432	1.000000000000000
0.067293208390681	0.038416547065253	1.000000000000000
0.060361207731244	0.050474931270300	1.000000000000000
0.026354697442437	0.014494744807025	1.000000000000000
0.038182488948520	0.038840223542607	1.000000000000000
0.079390572245519	0.051553896169115	1.000000000000000
0.039870392092735	0.046304326047254	1.000000000000000
0.040391325152431	0.087866386314252	1.000000000000000
0.010204213526300	0.046820416109113	1.000000000000000
-0.046855801805487	0.057296535542532	1.000000000000000
-0.017776350372478	0.026057288508248	1.000000000000000
-0.002618548057771	0.023873986859637	1.000000000000000
0	0	0
0.115755839940722	0.063765951421131	1.000000000000000
0.074465606014676	0.045376758669603	1.000000000000000

PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

0.073414973359474	0.058817376132849	1.000000000000000
0.035814513660570	0.054978457475532	1.000000000000000
0.057678066143696	0.059910902307749	1.000000000000000
0.017969286937309	0.059469053103686	1.000000000000000
0.016233659985570	0.050129751794371	1.000000000000000
-0.012882269949671	0.054000171956101	1.000000000000000
-0.003955660409708	0.036880554634350	1.000000000000000
-0.017281273853369	0.037180729090669	1.000000000000000
-0.009372888433276	0.020904382458738	1.000000000000000
-0.008543160072774	0.010943869687306	1.000000000000000
-0.006919973362551	0.008991851167019	1.000000000000000
0	0	0
-0.000471752546177	0.001206518318928	1.000000000000000
0.000038729507002	0.000126524883465	1.000000000000000
0.053486784775048	0.031250897483085	1.000000000000000
0.030750282533092	0.017929404700835	1.000000000000000
0.021671724867241	0.043116800134203	1.000000000000000
0.006984501370163	0.022378392223517	1.000000000000000
0.001214375618477	0.055714607660415	1.000000000000000
-0.012044099084828	0.035765000305851	1.000000000000000
-0.028137510778817	0.055556984997893	1.000000000000000
-0.033676988894322	0.046840306931264	1.000000000000000
-0.032268875672009	0.042479218745160	1.000000000000000
-0.040300472694691	0.044073121532744	1.000000000000000
-0.018821120628595	0.018920122320390	1.000000000000000
-0.025323479316899	0.037374555271925	1.000000000000000
-0.001994016477878	0.003659656045578	1.000000000000000
-0.004457579389123	0.022455221455952	1.000000000000000
0	0	0
0	0	0
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0.013143768142721	0.007318385123669	1.000000000000000
0.009302347410980	0.012906631344959	1.000000000000000
0.007570942904668	0.006467321537791	1.000000000000000
-0.002387730684325	0.016722263327207	1.000000000000000
0.001916158213823	0.005340762291754	1.000000000000000
-0.014209987125344	0.027494413998648	1.000000000000000
-0.001569520661223	0.007601268956354	1.000000000000000
-0.026228576796950	0.036375171511001	1.000000000000000
-0.007935694237598	0.014544466232287	1.000000000000000
-0.033208023153363	0.040374248950244	1.000000000000000
-0.016370302125756	0.022046627676117	1.000000000000000
-0.018639961780523	0.036167487501842	1.000000000000000
-0.015449701700479	0.032598050830207	1.000000000000000
-0.001537041787971	0.018157076700411	1.000000000000000
0.000536846569773	0.047951346737410	1.000000000000000
0.010754708570628	0.005966717424185	1.000000000000000
0.006771991769930	0.003221210145002	1.000000000000000
0.007972395724751	0.005070577603306	0
0.003326829646093	0.001734377328099	1.000000000000000
0.003909366591704	0.003320311614057	1.000000000000000
0.000249683128180	0.000120854792545	1.000000000000000
0.001306236617246	0.002358212460531	1.000000000000000
0	0	0
-0.000614319449387	0.002401548783354	1.000000000000000
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-0.000276054810214	0.008773151893169	1.000000000000000
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-0.008732088574019	0.018326831061991	1.000000000000000
-0.004475219885640	0.004503230396142	1.000000000000000
-0.013523821933052	0.040549101373384	1.000000000000000

-0.014999790450119	0.012018330356440	1.000000000000000
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0.002237136266081	0.002281158182172	1.000000000000000
0.006813348921827	0.020991679453260	1.000000000000000
0.027825376275022	0.030815311510441	1.000000000000000
0.013684916652130	0.065211403981700	1.000000000000000
0.050264947011840	0.071519306728424	1.000000000000000
0.003098773666731	0.103933023301947	1.000000000000000
0.003744519557370	0.090855303061444	1.000000000000000
-0.003317608141412	0.089612768821642	1.000000000000000
-0.022598939082080	0.077498270531360	1.000000000000000
-0.005609561951587	0.041636638843412	1.000000000000000
-0.020954060532368	0.047361404502561	1.000000000000000
-0.004128788654962	0.010661960839803	1.000000000000000
-0.006359310257291	0.019908164847405	1.000000000000000
0.000000126776839	0.000009733580433	0
0.000526788684362	0.001151470107718	1.000000000000000
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0.042521621644793	0.022518254742503	1.000000000000000
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0.112153629247277	0.070857704758024	1.000000000000000
0.076877495498257	0.069615480802267	1.000000000000000
0.098867463546019	0.076055244777236	1.000000000000000
0.035428455766432	0.077718366744727	1.000000000000000
0.038382301351652	0.050949404838602	1.000000000000000
-0.008180951949299	0.070837493787765	1.000000000000000
0.001723907673908	0.046943276438706	1.000000000000000
-0.034046521914882	0.057245566281928	1.000000000000000
0.051752127716235	0.075991077159110	1.000000000000000
-0.043133929359107	0.042741889902173	1.000000000000000
-0.011716982243534	0.064911702274470	1.000000000000000
-0.010339711261168	0.008183017776714	1.000000000000000
-0.012190496955056	0.015069239791133	1.000000000000000
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0.124643403569201	0.059587061630349	1.000000000000000
0.115422406810117	0.070477684158029	1.000000000000000
0.226442553953814	0.113015260625642	1.000000000000000
0.097185061112482	0.066214035945930	1.000000000000000
0.207878255081372	0.107012717495675	1.000000000000000
0.061740391087807	0.044831636628608	1.000000000000000
0.145893255530106	0.077202704706199	1.000000000000000
0.026385421657912	0.043607610116816	1.000000000000000
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-0.082914715176802	0.111748750714195	1.000000000000000
0.094433474540156	0.169216813673945	1.000000000000000
-0.089838675579292	0.096997108309862	1.000000000000000
-0.174916352148214	0.113076994712247	1.000000000000000
0.131157115317487	0.062486953718176	1.000000000000000
0.178976150687351	0.086312443295761	1.000000000000000
0.129657273347749	0.061945170026147	1.000000000000000
0.153130543016185	0.073168861564935	1.000000000000000
0.068703527533341	0.032660890488474	1.000000000000000
0.109015355194285	0.053107852471127	1.000000000000000
0.003145498617398	0.001524754074760	0
0.034400428461699	0.016226452233445	1.000000000000000
0.099708859281053	0.047461291990615	1.000000000000000
0.127112631374584	0.066077909783642	1.000000000000000
0.175720585903739	0.092472042653674	1.000000000000000

0.146594892108781	0.105705583342857	1.000000000000000
0.266359774019451	0.127030050777374	1.000000000000000
0.023229964938630	0.121866478313254	1.000000000000000
0.395874046453187	0.189451245785775	1.000000000000000
-0.108460794413312	0.073520975763134	1.000000000000000
0.172456353682303	0.088283567659438	1.000000000000000
0.149862121873523	0.079426972145940	1.000000000000000
0.111987204570641	0.062177791730174	1.000000000000000
0.090300894176336	0.063801545322418	1.000000000000000
0.077750646232688	0.044470379706578	1.000000000000000
0.070303898672056	0.059081487231726	1.000000000000000
0.031096385480670	0.017039386305514	1.000000000000000
0.044844406427697	0.045207748652077	1.000000000000000
0.091921684574089	0.059737543934589	1.000000000000000
0.046718270414842	0.053772806983918	1.000000000000000
0.047614928242471	0.101863950932014	1.000000000000000
0.011816934515773	0.054314656594515	1.000000000000000
-0.054399358634980	0.066506565037244	1.000000000000000
-0.021030153788109	0.030423578895429	1.000000000000000
-0.003159804252732	0.028061487241062	1.000000000000000
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0.080250224183121	0.049744375280761	1.000000000000000
0.086160027044876	0.069182351997362	1.000000000000000
0.041443002405769	0.064060221525433	1.000000000000000
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0.021015414139457	0.069773656456189	1.000000000000000
0.018609490151666	0.058499503989103	1.000000000000000
-0.015538509214201	0.063396241827643	1.000000000000000
-0.004313784828383	0.042729662495179	1.000000000000000
-0.019974933193672	0.043593220391666	1.000000000000000
-0.010750166337886	0.024195039692306	1.000000000000000
-0.010177834484752	0.012980681253362	1.000000000000000
-0.008089863181153	0.010637915754255	1.000000000000000
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0.000064822931808	0.000206067202147	1.000000000000000
0.056381615323782	0.033380774714668	1.000000000000000
0.031600781819195	0.018552839379764	1.000000000000000
0.024078515054484	0.049573879297088	1.000000000000000
0.007246586603786	0.024918310024867	1.000000000000000
0.000922586388518	0.065347673175064	1.000000000000000
-0.014397620766020	0.041484507386174	1.000000000000000
-0.033509271099834	0.065479858797097	1.000000000000000
-0.039901955160921	0.055034859051610	1.000000000000000
-0.037930059785537	0.050094837329812	1.000000000000000
-0.048360776247209	0.052354836529586	1.000000000000000
-0.022774900787562	0.022754617184673	1.000000000000000
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0.013276975604516	0.007381279003781	1.000000000000000
0.009508127290269	0.013869858315907	1.000000000000000
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-0.002249818325117	0.008607072527962	1.000000000000000

-0.031314224657719	0.043083493494950	1.000000000000000
-0.009971053523444	0.017090787708457	1.000000000000000
-0.040274976147885	0.048377182199077	1.000000000000000
-0.019925061245859	0.026170171217512	1.000000000000000
-0.022150271945052	0.043371950595654	1.000000000000000
-0.018382563475698	0.039035637306727	1.000000000000000
-0.001874943921115	0.021830736571489	1.000000000000000
0.001302644262547	0.057862750035069	1.000000000000000
0.010891291826171	0.006063635698402	1.000000000000000
0.006842806960337	0.003256491979879	1.000000000000000
0.007972395724751	0.005070577603306	0
0.003327711305662	0.001734906646132	1.000000000000000
0.003984948795652	0.003394180980090	1.000000000000000
0.000255446270122	0.000123547640143	1.000000000000000
0.001181413796225	0.002577395150572	1.000000000000000
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0.000565067511090	0.001462592624720	1.000000000000000
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0.002389470075769	0.002394770815516	1.000000000000000
0.007278301794535	0.022129250865338	1.000000000000000
0.029414080169894	0.032479690555454	1.000000000000000
0.014642233988660	0.068901301398051	1.000000000000000
0.053350258212227	0.075593030463980	1.000000000000000
0.003433127517199	0.109930203565336	1.000000000000000
0.003806017667704	0.096230997550199	1.000000000000000
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-0.024706345690225	0.081976180671855	1.000000000000000
-0.006045355104111	0.043991138301873	1.000000000000000
-0.021992571771334	0.049944371016029	1.000000000000000
-0.004562156558070	0.011454325043255	1.000000000000000
-0.006838104935050	0.021099027377090	1.000000000000000
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0.000567344605717	0.001222340461450	1.000000000000000
0.014865938930499	0.011732034453697	1.000000000000000
0.045086207378199	0.023807243183703	1.000000000000000
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0.037576420559852	0.082301342102750	1.000000000000000
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-0.009332596197937	0.075021686875709	1.000000000000000
0.001834946272610	0.049784700715750	1.000000000000000
-0.036223604831940	0.060605812220519	1.000000000000000
0.055486140209869	0.080642200696699	1.000000000000000
-0.046534124111450	0.045325187378961	1.000000000000000
-0.012383972274166	0.068651132739961	1.000000000000000
-0.011463390302387	0.008777332299585	1.000000000000000
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0.131767787360604	0.062978981018777	1.000000000000000
0.121616786263984	0.074281913467555	1.000000000000000
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PLASTIC STRAIN output from Abaqus to Matlab (Record key 22)

0.102630301132968	0.069866022564345	1.000000000000000
0.221096694217515	0.113768030837192	1.000000000000000
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0.027456439785627	0.046115485256272	1.000000000000000
0.188488484176498	0.106226258353392	1.000000000000000
0.002630744974060	0.069443770113794	1.000000000000000
0.195684349793835	0.155113027097131	1.000000000000000
-0.088877829485785	0.118364958870363	1.000000000000000
0.098149418683965	0.178448196260377	1.000000000000000
-0.095352773593813	0.103094533869145	1.000000000000000
-0.185354427111064	0.119328130203284	1.000000000000000
0.138121317229987	0.065812589873682	1.000000000000000
0.188562492970469	0.090950945322760	1.000000000000000
0.137454529523088	0.065641078867345	1.000000000000000
0.163435623568037	0.078099670903130	1.000000000000000
0.072424884660408	0.034424570682989	1.000000000000000
0.115971345718642	0.056497711155740	1.000000000000000
0.003145498617398	0.001524754074760	0
0.037001137577716	0.017457867260015	1.000000000000000
0.106098596072804	0.050493800866608	1.000000000000000
0.135222661912024	0.070309016583174	1.000000000000000
0.186888953835318	0.098252300255593	1.000000000000000
0.155888243831317	0.112483873050393	1.000000000000000
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0.024307045616868	0.128982903503067	1.000000000000000
0.418442306557954	0.200168764394017	1.000000000000000
-0.113440103273970	0.077162903325178	1.000000000000000
0.181431263775253	0.092987101709308	1.000000000000000
0.157005878778103	0.083362350143769	1.000000000000000
0.119758873873420	0.066609524317799	1.000000000000000
0.096537578980608	0.068377901038158	1.000000000000000
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0.074964965318109	0.063117664770894	1.000000000000000
0.033348348647439	0.018244314347445	1.000000000000000
0.047979380774923	0.048195939673589	1.000000000000000
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0.030707948811822
                0
0.081755797972742
0.057491548215875
0.075716267047090
0.070708026975227
0.077032321161343
0.076510760077724
0.064484501855394
0.069439415378824
0.047428131821888
0.047819388920177
0.026875369494582
0.014069367617350
0.011558363049046
                0
0.001549554040830
0.000162798290072
0.039865431383073
0.022971657123027
0.055356381568041
0.028559884217040
0.071643228960746
0.045880611682143
0.071452418094958
0.060173822849807
0.054631869874505
0.056604302450410
0.024307980647900
0.048068762652350
0.004693190495651
0.028874741091378
                0
                0
0.015298528745291
0.009362282282568
0.016379088323036
0.008250147185645
0.021200831621586
0.006715335769102
0.035266050794118
0.009523920024725
```

0.046709014542197
0.018513713621363
0.051885016374121
0.028276356547448
0.046539056835921
0.041956193229978
0.023356581897300
0.061694795384490
0.007601156826011
0.004129631464795
0.006484096636627
0.002198134172095
0.004232056318173
0.000154988906106
0.002908786895153
0
0.003019561162875
0
0.011279389539593
0.001511559411742
0.023575246743615
0.005602495681951
0.052181655664648
0.015292369259373
0.000489308717686
0.002914933784731
0.026907307919924
0.039554878826009
0.083876306638237
0.091932681430652
0.133771835491011
0.116928075742220
0.115316293901635
0.099507397845645
0.053468709845618
0.060816207980665
0.013543404412502
0.025464370231038
0.000012540110139
0.001476813708620
0.014193956490495
0.028746752282456
0.061829335434647
0.091071437309578
0.089413233507606
0.097743776790844
0.100001041599311
0.065450921902439
0.091011515052178
0.060313127118942
0.073476031314166
0.097515718471523
0.054336012083278
0.083418217387257
0.009826577075851
0.019045084372715
0.041971972702619
0.076521463247977
0.090701352934319
0.145332541321438
0.085172520431279

```
0.137601279534238
0.057647620401612
0.099331040448677
0.055967714224300
0.128952228551826
0.083726179816565
0.188605904478703
0.143065069602157
0.216848816217277
0.095771865737153
0.144191820863164
0.080041694758848
0.110919517626890
0.079144128061706
0.093702841620934
0.041748997770249
0.068291133373037
0.001934092627440
0.020846497268727
0.060956186755328
0.084955325387710
0.118982199233777
0.135830244377535
0.163450733564225
0.156437666501985
0.242227929273539
0.093995493456963
0.113370814846746
0.101865947090463
0.079808999902491
0.081992170097383
0.057204472629424
0.076023707938904
0.021882830126837
0.058160715287398
0.076885777535044
0.069182594393165
0.131070735327568
0.069890461679840
0.085578578484180
0.039105819029839
0.036095513907249
                0
0.091004707730172
0.062991770581921
0.089066895879406
0.082402775198117
0.090480747293583
0.089780154594281
0.075261661134934
0.081535170648957
0.054956802974489
0.056071592775922
0.031107882532048
0.016691028359477
0.013675725521005
                0
0.001971104105153
0.000265077754225
0.042531937460121
```

```
0.023752384653321
0.063657461850936
0.031816558242921
0.084044502641295
0.053240786509505
0.084226613527688
0.070716855718408
0.064435410906390
0.067264921994959
0.029240695489794
0.057821594679264
0.005767337096638
0.034753357137562
                0
                0
0.015494965878979
0.009432905766070
0.017586237758629
0.008410213897295
0.023843688607834
0.006972568397375
0.041007224116256
0.010792521043036
0.055340572037466
0.021769110693648
0.062186046204695
0.033577637879096
0.055810369763319
0.050245097902812
0.028084954129684
0.074447755991891
0.007719358495471
0.004174398543450
0.006484096636627
0.002198794820352
0.004326480521085
0.000158344950847
0.003156111028918
                0
0.003622433716188
                0
0.013470342813309
0.001875897269753
0.028346888409371
0.006878511138643
0.063148784610162
0.018702091980202
0.000489308717686
0.003057852114972
0.028368403488876
0.041696604509897
0.088628046290109
0.097178271424927
0.141497630208600
0.123852818790665
0.121780765576243
0.105257756569424
0.056499346551676
0.064141666158394
0.014554064781235
0.026992360815880
```

0.000012540110139
0.001567486995799
0.014956995489989
0.030394041506904
0.065367637533604
0.096425002298179
0.094788041361366
0.103742865641483
0.105904922156992
0.069456994066521
0.096388063734628
0.063972688057138
0.077802046857886
0.103402349277188
0.057621511124947
0.088234073234432
0.010526279494036
0.020142766986226
0.044102194246213
0.080888771100238
0.095602210636516
0.154561842457081
0.089876259948806
0.146303086369413
0.060515757638681
0.105110177396332
0.059186275734550
0.136614609123576
0.089188285924328
0.199609224561175
0.151564389739427
0.228712959444875
0.101065163705818
0.152216580129057
0.084320692328312
0.116892712295879
0.083889211945641
0.100048666506533
0.044017535791487
0.072657392998381
0.001934092627440
0.022431733398136
0.064860647307665
0.090404414636514
0.126424471045559
0.144561482742015
0.172642008211462
0.165595080476538
0.255997452844045
0.098651402076985
0.119422175240254
0.106921326951644
0.085512496008491
0.087882860271608
0.060838353495549
0.081221860581704
0.023432210933885
0.062007286310275
0.081822486304153
0.073694812213502

```
0.139536739584193
0.074428285782827
0.091170872380105
0.041757187781691
0.038618095386850
                0
0.095349007355481
0.065583450203714
0.095334898312599
0.087895255769921
0.096794073876365
0.096011272229854
0.080317843271781
0.087213934213334
0.058491839232273
0.059946047216641
0.033102451818995
0.017927600586884
0.014679968532312
                0
0.002169962318467
0.000315031198873
0.043786303465549
0.024118926443820
0.067554015810562
0.033345116231165
0.089868656928296
0.056694649512302
0.090226961522135
0.075666672461468
0.069037419530953
0.072273993797226
0.031561289670595
0.062405862865247
0.006268519195422
0.037515281837191
                0
                0
0.015587871074173
0.009464756116767
0.018154978903789
0.008485778997580
0.025085642035144
0.007097228742216
0.043701366481041
0.011395555671586
0.059392813424681
0.023298723634914
0.067025141461817
0.036066643783843
0.060160906840884
0.054137356840212
0.030302846115185
0.080443940978160
0.007772646282798
0.004194243231331
0.006484096636627
0.002198794820352
0.004370495853242
0.000159990218445
0.003274976913186
```

```
                  0
   0.003911006168297
                  0
   0.014503708455264
   0.002050789591100
   0.030597863349689
   0.007492298148144
   0.068315980269528
   0.020320674303086
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     7
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

        2016
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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CREEP STRAIN (INCLUDING SWELLING) output from Abaqus to Matlab (Record key 23)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\23.inp'],[S(1:a(end)-1),'\23.inp'],'f')
```

Run the input file 23.inp with Abaqus

```
!abaqus job=23
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('23.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('23.fil');
```

Obtain the desired output data

```
out = Rec23(Rec)
```

```
out =

  Columns 1 through 3

  -0.001678517716520  -0.001678517716520  -0.001465798211819
  -0.006555438504111  -0.006555438504111  -0.004982935942236
  -0.014885418707394  -0.014885418707394  -0.009802141809084
  -0.027361096328980  -0.027361096328980  -0.015537649983191
  -0.045302897953427  -0.045302897953427  -0.022156155914642

  Columns 4 through 6

                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0

  Columns 7 through 9

   0.000141813003134                   0   0.002277924178884
   0.001048335041250                   0   0.008593687550243
   0.003388851265540                   0   0.018960192759819
   0.007882297563859                   0   0.034045829422976
   0.015431161359191                   0   0.055351003428852
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     9
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     5
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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TOTAL INELASTIC STRAIN output from Abaqus to Matlab (Record key 24)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\24.inp'],[S(1:a(end)-1),'\24.inp'],'f')
```

Run the input file 24.inp with Abaqus

```
!abaqus job=24
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('24.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('24.fil');
```

Obtain the desired output data

```
out = Rec24(Rec)
```

```
out =

  Columns 1 through 3

  -0.001678517716520  -0.001678517716520  -0.001465798211819
  -0.006555438504111  -0.006555438504111  -0.004982935942236
  -0.014885418707394  -0.014885418707394  -0.009802141809084
  -0.027361096328980  -0.027361096328980  -0.015537649983191
  -0.045302897953427  -0.045302897953427  -0.022156155914642

  Columns 4 through 6

                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     5
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

TOTAL ELASTIC STRAIN output from Abaqus to Matlab (Record key 25)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\25.inp'],[S(1:a(end)-1),'\25.inp'],'f')
```

Run the input file 25.inp with Abaqus

```
!abaqus job=25
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('25.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('25.fil');
```

Obtain the desired output data

```
out = Rec25(Rec)
```

```
out =

  Columns 1 through 3

   0.004505220263068   0.004505220263068  -0.039356196308437
   0.008067766699615   0.008067766699615  -0.078398672996815
   0.010570999637494   0.010570999637494  -0.118031229700801
   0.011761418091367   0.011761418091367  -0.158815737161587
   0.011206397720514   0.011206397720514  -0.200987395399568

  Columns 4 through 6

                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     5
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

```
________________________________________________________
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Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/
```

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UNIT NORMAL TO CRACK IN CONCRETE output from Abaqus to Matlab (Record key 26)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\26.inp'],[S(1:a(end)-1),'\26.inp'],'f')
```

Run the input file 26.inp with Abaqus

```
!abaqus job=26
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('26.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('26.fil');
```

Obtain the desired output data

```
out = Rec26(Rec)
```

```
out =

     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
```

UNIT NORMAL TO CRACK IN CONCRETE output from Abaqus to Matlab (Record key 26)

0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0

```
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     9
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   160
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

SECTION THICKNESS output from Abaqus to Matlab (Record key 27)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\27.inp'],[S(1:a(end)-1),'\27.inp'],'f')
```

Run the input file 27.inp with Abaqus

```
!abaqus job=27
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('27.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('27.fil');
```

Obtain the desired output data

```
out = Rec27(Rec)
```

```
out =

   2.954919333848296
   2.954919333848296
   2.954919333848296
   2.800000000000000
   2.800000000000000
   2.800000000000000
   2.645080666151704
   2.645080666151705
   2.645080666151704
   2.554919333848296
   2.554919333848296
   2.554919333848296
   2.400000000000000
   2.400000000000000
   2.400000000000000
   2.245080666151703
   2.245080666151703
   2.245080666151703
   2.154919333848295
   2.154919333848296
   2.154919333848296
   2.000000000000000
   2.000000000000000
   2.000000000000000
   1.845080666151704
   1.845080666151704
   1.845080666151704
   1.754919333848296
   1.754919333848297
   1.754919333848296
   1.600000000000000
   1.600000000000000
   1.600000000000000
   1.445080666151704
   1.445080666151704
   1.445080666151704
   1.354919333848296
   1.354919333848296
   1.354919333848296
   1.200000000000000
   1.200000000000000
   1.200000000000000
   1.045080666151704
   1.045080666151704
   1.045080666151704
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =
```

```
     1
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    45
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


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HEAT FLUX VECTOR output from Abaqus to Matlab (Record key 28)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\28.inp'],[S(1:a(end)-1),'\28.inp'],'f')
```

Run the input file 28.inp with Abaqus

```
!abaqus job=28
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('28.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('28.fil');
```

Obtain the desired output data

```
out = Rec28(Rec)
```

```
out =

   1.0e+03 *

   0.000011319310404  -0.000000000000000  -0.000011319310404
   0.000011319310404  -0.000000000000000  -0.000011319310404
   0.000011319310404  -0.000000000000000  -0.000011319310404
   0.000011319310404  -0.000000000000000  -0.000011319310404
   0.000050354760140                   0  -0.000050354760140
   0.000050354760140                   0  -0.000050354760140
   0.000050354760140   0.000000000000000  -0.000050354760140
   0.000050354760140   0.000000000000000  -0.000050354760140
   0.000162332683802   0.000000000000000  -0.000162332683802
   0.000162332683802   0.000000000000000  -0.000162332683802
   0.000162332683802                   0  -0.000162332683802
   0.000162332683802                   0  -0.000162332683802
   0.000509461104870  -0.000000000000000  -0.000509461104870
   0.000509461104870  -0.000000000000000  -0.000509461104870
   0.000509461104870  -0.000000000000000  -0.000509461104870
   0.000509461104870  -0.000000000000000  -0.000509461104870
   0.001594580292702  -0.000000000000000  -0.001594580292702
   0.001594580292702  -0.000000000000000  -0.001594580292702
   0.001594580292702   0.000000000000000  -0.001594580292702
   0.001594580292702   0.000000000000000  -0.001594580292702
   0.004989562988281   0.000000000000000  -0.004989562988281
   0.004989562988281   0.000000000000000  -0.004989562988281
   0.004989562988281  -0.000000000000000  -0.004989562988281
   0.004989562988281  -0.000000000000000  -0.004989562988281
   0.015612283706665  -0.000000000000000  -0.015612283706665
   0.015612283706665  -0.000000000000000  -0.015612283706665
   0.015612283706665  -0.000000000000000  -0.015612283706665
   0.015612283706665  -0.000000000000000  -0.015612283706665
   0.048850513458252  -0.000000000000000  -0.048850513458252
   0.048850513458252  -0.000000000000000  -0.048850513458252
   0.048850513458252                   0  -0.048850513458252
   0.048850513458252                   0  -0.048850513458252
   0.152852203369141  -0.000000000000000  -0.152852203369141
   0.152852203369141  -0.000000000000000  -0.152852203369141
   0.152852203369141  -0.000000000000000  -0.152852203369141
   0.152852203369141  -0.000000000000000  -0.152852203369141
   0.478271209716797  -0.000000000000000  -0.478271209716797
   0.478271209716797  -0.000000000000000  -0.478271209716797
   0.478271209716797                   0  -0.478271209716797
   0.478271209716797                   0  -0.478271209716797
   0.000065553188324  -0.000000000000000  -0.000065553188324
   0.000065553188324  -0.000000000000000  -0.000065553188324
   0.000065553188324                   0  -0.000065553188324
   0.000065553188324                   0  -0.000065553188324
   0.000275221198797   0.000000000000000  -0.000275221198797
   0.000275221198797   0.000000000000000  -0.000275221198797
   0.000275221198797   0.000000000000000  -0.000275221198797
   0.000275221198797   0.000000000000000  -0.000275221198797
   0.000810624301434   0.000000000000000  -0.000810624301434
   0.000810624301434   0.000000000000000  -0.000810624301434
   0.000810624301434  -0.000000000000000  -0.000810624301434
   0.000810624301434  -0.000000000000000  -0.000810624301434
   0.002285124063492  -0.000000000000000  -0.002285124063492
   0.002285124063492  -0.000000000000000  -0.002285124063492
   0.002285124063492  -0.000000000000000  -0.002285124063492
```

0.002285124063492	-0.000000000000000	-0.002285124063492
0.006331799030304	0	-0.006331799030304
0.006331799030304	0	-0.006331799030304
0.006331799030304	0.000000000000000	-0.006331799030304
0.006331799030304	0.000000000000000	-0.006331799030304
0.017240673065186	0.000000000000000	-0.017240673065186
0.017240673065186	0.000000000000000	-0.017240673065186
0.017240673065186	0	-0.017240673065186
0.017240673065186	0	-0.017240673065186
0.045896156311035	-0.000000000000000	-0.045896156311035
0.045896156311035	-0.000000000000000	-0.045896156311035
0.045896156311035	-0.000000000000000	-0.045896156311035
0.045896156311035	-0.000000000000000	-0.045896156311035
0.118419990539551	-0.000000000000000	-0.118419990539551
0.118419990539551	-0.000000000000000	-0.118419990539551
0.118419990539551	0	-0.118419990539551
0.118419990539551	0	-0.118419990539551
0.291720184326172	-0.000000000000000	-0.291720184326172
0.291720184326172	-0.000000000000000	-0.291720184326172
0.291720184326172	-0.000000000000000	-0.291720184326172
0.291720184326172	-0.000000000000000	-0.291720184326172
0.666180541992187	-0.000000000000000	-0.666180541992187
0.666180541992187	-0.000000000000000	-0.666180541992187
0.666180541992187	0	-0.666180541992187
0.666180541992187	0	-0.666180541992187
0.000211415484548	-0.000000000000000	-0.000211415484548
0.000211415484548	-0.000000000000000	-0.000211415484548
0.000211415484548	0	-0.000211415484548
0.000211415484548	0	-0.000211415484548
0.000845538437366	0	-0.000845538437366
0.000845538437366	0	-0.000845538437366
0.000845538437366	0	-0.000845538437366
0.000845538437366	0	-0.000845538437366
0.002305806636810	0.000000000000000	-0.002305806636810
0.002305806636810	0.000000000000000	-0.002305806636810
0.002305806636810	0	-0.002305806636810
0.002305806636810	0	-0.002305806636810
0.005931953430176	0.000000000000000	-0.005931953430176
0.005931953430176	0.000000000000000	-0.005931953430176
0.005931953430176	-0.000000000000000	-0.005931953430176
0.005931953430176	-0.000000000000000	-0.005931953430176
0.014840791702271	0	-0.014840791702271
0.014840791702271	0	-0.014840791702271
0.014840791702271	0.000000000000000	-0.014840791702271
0.014840791702271	0.000000000000000	-0.014840791702271
0.036075515747070	0.000000000000000	-0.036075515747070
0.036075515747070	0.000000000000000	-0.036075515747070
0.036075515747070	0	-0.036075515747070
0.036075515747070	0	-0.036075515747070
0.084593856811523	0	-0.084593856811523
0.084593856811523	0	-0.084593856811523
0.084593856811523	0	-0.084593856811523
0.084593856811523	0	-0.084593856811523
0.189168579101563	0	-0.189168579101563
0.189168579101563	0	-0.189168579101563
0.189168579101563	0	-0.189168579101563
0.189168579101563	0	-0.189168579101563
0.396227661132812	-0.000000000000000	-0.396227661132812
0.396227661132812	-0.000000000000000	-0.396227661132812
0.396227661132812	-0.000000000000000	-0.396227661132812
0.396227661132812	-0.000000000000000	-0.396227661132812

HEAT FLUX VECTOR output from Abaqus to Matlab (Record key 28)

0.754673339843750	-0.000000000000000	-0.754673339843750
0.754673339843750	-0.000000000000000	-0.754673339843750
0.754673339843750	0	-0.754673339843750
0.754673339843750	0	-0.754673339843750
0.000502667069435	-0.000000000000000	-0.000502667069435
0.000502667069435	-0.000000000000000	-0.000502667069435
0.000502667069435	0	-0.000502667069435
0.000502667069435	0	-0.000502667069435
0.001929899930954	0	-0.001929899930954
0.001929899930954	0	-0.001929899930954
0.001929899930954	0	-0.001929899930954
0.001929899930954	0	-0.001929899930954
0.004927907943726	0	-0.004927907943726
0.004927907943726	0	-0.004927907943726
0.004927907943726	0	-0.004927907943726
0.004927907943726	0	-0.004927907943726
0.011724217414856	0	-0.011724217414856
0.011724217414856	0	-0.011724217414856
0.011724217414856	0	-0.011724217414856
0.011724217414856	0	-0.011724217414856
0.026911035537720	0	-0.026911035537720
0.026911035537720	0	-0.026911035537720
0.026911035537720	0	-0.026911035537720
0.026911035537720	0	-0.026911035537720
0.059582462310791	0	-0.059582462310791
0.059582462310791	0	-0.059582462310791
0.059582462310791	-0.000000000000000	-0.059582462310791
0.059582462310791	-0.000000000000000	-0.059582462310791
0.126305374145508	-0.000000000000000	-0.126305374145508
0.126305374145508	0	-0.126305374145508
0.126305374145508	0.000000000000000	-0.126305374145508
0.126305374145508	0.000000000000000	-0.126305374145508
0.253450408935547	0.000000000000000	-0.253450408935547
0.253450408935547	0.000000000000000	-0.253450408935547
0.253450408935547	0	-0.253450408935547
0.253450408935547	0	-0.253450408935547
0.473712280273437	0	-0.473712280273437
0.473712280273437	0	-0.473712280273437
0.473712280273437	0	-0.473712280273437
0.473712280273437	0	-0.473712280273437
0.806216125488281	0.000000000000000	-0.806216125488281
0.806216125488281	0.000000000000000	-0.806216125488281
0.806216125488281	0.000000000000000	-0.806216125488281
0.806216125488281	0.000000000000000	-0.806216125488281
0.000985086083412	-0.000000000000000	-0.000985086083412
0.000985086083412	-0.000000000000000	-0.000985086083412
0.000985086083412	0	-0.000985086083412
0.000985086083412	0	-0.000985086083412
0.003654076576233	0	-0.003654076576233
0.003654076576233	0	-0.003654076576233
0.003654076576233	0	-0.003654076576233
0.003654076576233	0	-0.003654076576233
0.008820659637451	-0.000000000000000	-0.008820659637451
0.008820659637451	-0.000000000000000	-0.008820659637451
0.008820659637451	-0.000000000000000	-0.008820659637451
0.008820659637451	-0.000000000000000	-0.008820659637451
0.019626173019409	-0.000000000000000	-0.019626173019409
0.019626173019409	-0.000000000000000	-0.019626173019409
0.019626173019409	-0.000000000000000	-0.019626173019409
0.019626173019409	-0.000000000000000	-0.019626173019409

0.041878231048584	-0.000000000000000	-0.041878231048584
0.041878231048584	-0.000000000000000	-0.041878231048584
0.041878231048584	0	-0.041878231048584
0.041878231048584	0	-0.041878231048584
0.085811347961426	0	-0.085811347961426
0.085811347961426	0	-0.085811347961426
0.085811347961426	0	-0.085811347961426
0.085811347961426	0	-0.085811347961426
0.167738876342773	0	-0.167738876342773
0.167738876342773	0	-0.167738876342773
0.167738876342773	0	-0.167738876342773
0.167738876342773	0	-0.167738876342773
0.309685791015625	0	-0.309685791015625
0.309685791015625	0	-0.309685791015625
0.309685791015625	0	-0.309685791015625
0.309685791015625	0	-0.309685791015625
0.533093627929688	0	-0.533093627929688
0.533093627929688	0	-0.533093627929688
0.533093627929688	0	-0.533093627929688
0.533093627929688	0	-0.533093627929688
0.842519714355469	0	-0.842519714355469
0.842519714355469	0	-0.842519714355469
0.842519714355469	0	-0.842519714355469
0.842519714355469	0	-0.842519714355469
0.001687946915627	-0.000000000000000	-0.001687946915627
0.001687946915627	-0.000000000000000	-0.001687946915627
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HEAT FLUX VECTOR output from Abaqus to Matlab (Record key 28)

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0.937589172363281	0	-0.937589172363281
0.937589172363281	0	-0.937589172363281
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1.144054809570313	-0.000000000000000	-1.144054809570313
1.144054809570313	-0.000000000000001	-1.144054809570313
1.144054809570313	-0.000000000000001	-1.144054809570313
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1.377003662109375	-0.000000000000001	-1.377003662109375
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1.377003662109375	0	-1.377003662109375
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0.045414947509766	0	-0.045414947509766
0.045414947509766	0	-0.045414947509766
0.045414947509766	0	-0.045414947509766
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0.138354217529297	0	-0.138354217529297
0.237557266235352	0	-0.237557266235352
0.237557266235352	0	-0.237557266235352
0.237557266235352	0	-0.237557266235352
0.237557266235352	0	-0.237557266235352
0.346990600585938	0	-0.346990600585938
0.346990600585938	0	-0.346990600585938
0.346990600585938	0	-0.346990600585938
0.346990600585938	0	-0.346990600585938
0.470325073242187	-0.000000000000000	-0.470325073242187
0.470325073242187	-0.000000000000000	-0.470325073242187
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0.610854614257813	0	-0.610854614257813
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0.954562805175781	0	-0.954562805175781
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1.396336059570313	0	-1.396336059570313
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1.396336059570313	0.000000000000001	-1.396336059570313
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0.046842163085937	-0.000000000000000	-0.046842163085937
0.046842163085937	0	-0.046842163085937
0.046842163085937	0	-0.046842163085937
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0.142593902587891	0	-0.142593902587891
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0.142593902587891	0	-0.142593902587891
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0.482007843017578	0	-0.482007843017578
0.482007843017578	0	-0.482007843017578
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0.624520202636719	0	-0.624520202636719
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0.624520202636719	0	-0.624520202636719
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0.786828247070313	0	-0.786828247070313
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0.786828247070313	0	-0.786828247070313
0.971411254882813	0	-0.971411254882813
0.971411254882813	0	-0.971411254882813
0.971411254882813	0	-0.971411254882813
0.971411254882813	0	-0.971411254882813
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1.415664428710938	0.000000000000000	-1.415664428710938
1.415664428710938	0.000000000000001	-1.415664428710938
1.415664428710938	0.000000000000001	-1.415664428710938
0.048242092132568	0.000000000000000	-0.048242092132568
0.048242092132568	0.000000000000000	-0.048242092132568
0.048242092132568	0.000000000000000	-0.048242092132568
0.048242092132568	0.000000000000000	-0.048242092132568
0.146754165649414	0.000000000000000	-0.146754165649414
0.146754165649414	0.000000000000000	-0.146754165649414

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0.146754165649414	0	-0.146754165649414
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0.251292694091797	0	-0.251292694091797
0.251292694091797	0	-0.251292694091797
0.251292694091797	0	-0.251292694091797
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0.365689544677734	0	-0.365689544677734
0.365689544677734	0	-0.365689544677734
0.365689544677734	0	-0.365689544677734
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0.493515747070312	0	-0.493515747070312
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0.493515747070312	0	-0.493515747070312
0.638011901855469	0	-0.638011901855469
0.638011901855469	0	-0.638011901855469
0.638011901855469	0	-0.638011901855469
0.638011901855469	0	-0.638011901855469
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0.802051818847656	0	-0.802051818847656
0.802051818847656	0	-0.802051818847656
0.802051818847656	0	-0.802051818847656
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0.988144165039063	0	-0.988144165039063
0.988144165039063	0	-0.988144165039063
0.988144165039063	0	-0.988144165039063
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1.198475341796875	0	-1.198475341796875
1.198475341796875	0	-1.198475341796875
1.198475341796875	0	-1.198475341796875
1.434989135742188	0	-1.434989135742188
1.434989135742188	0	-1.434989135742188
1.434989135742188	0	-1.434989135742188
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0.049616367340088	0	-0.049616367340088
0.049616367340088	0	-0.049616367340088
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0.150839843750000	0.000000000000000	-0.150839843750000
0.150839843750000	0.000000000000000	-0.150839843750000
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0.257981719970703	0.000000000000000	-0.257981719970703
0.257981719970703	0	-0.257981719970703
0.257981719970703	0	-0.257981719970703
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0.374813110351563	0	-0.374813110351563
0.374813110351563	0	-0.374813110351563
0.374813110351563	0	-0.374813110351563
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0.504860626220703	0	-0.504860626220703
0.504860626220703	0	-0.504860626220703
0.504860626220703	0	-0.504860626220703
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0.651342041015625	0	-0.651342041015625
0.651342041015625	0	-0.651342041015625
0.651342041015625	0	-0.651342041015625
0.817132995605469	0	-0.817132995605469
0.817132995605469	0	-0.817132995605469

0.817132995605469	0	-0.817132995605469
0.817132995605469	0	-0.817132995605469
1.004770202636719	0	-1.004770202636719
1.004770202636719	0	-1.004770202636719
1.004770202636719	0	-1.004770202636719
1.004770202636719	0	-1.004770202636719
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1.216491455078125	0	-1.216491455078125
1.216491455078125	0	-1.216491455078125
1.216491455078125	0	-1.216491455078125
1.454310302734375	0.000000000000000	-1.454310302734375
1.454310302734375	0.000000000000000	-1.454310302734375
1.454310302734375	0.000000000000001	-1.454310302734375
1.454310302734375	0.000000000000001	-1.454310302734375
0.050966567993164	0	-0.050966567993164
0.050966567993164	0	-0.050966567993164
0.050966567993164	0	-0.050966567993164
0.050966567993164	0	-0.050966567993164
0.154855560302734	0	-0.154855560302734
0.154855560302734	0	-0.154855560302734
0.154855560302734	0	-0.154855560302734
0.154855560302734	0	-0.154855560302734
0.264561614990234	-0.000000000000000	-0.264561614990234
0.264561614990234	-0.000000000000000	-0.264561614990234
0.264561614990234	-0.000000000000000	-0.264561614990234
0.264561614990234	-0.000000000000000	-0.264561614990234
0.383799133300781	-0.000000000000000	-0.383799133300781
0.383799133300781	-0.000000000000000	-0.383799133300781
0.383799133300781	0	-0.383799133300781
0.383799133300781	0	-0.383799133300781
0.516053588867188	0.000000000000000	-0.516053588867188
0.516053588867188	0.000000000000000	-0.516053588867188
0.516053588867188	0	-0.516053588867188
0.516053588867188	0	-0.516053588867188
0.664521911621094	0	-0.664521911621094
0.664521911621094	0	-0.664521911621094
0.664521911621094	0	-0.664521911621094
0.664521911621094	0	-0.664521911621094
0.832082153320313	-0.000000000000000	-0.832082153320313
0.832082153320313	-0.000000000000000	-0.832082153320313
0.832082153320313	0	-0.832082153320313
0.832082153320313	0	-0.832082153320313
1.021297363281250	0	-1.021297363281250
1.021297363281250	0	-1.021297363281250
1.021297363281250	0	-1.021297363281250
1.021297363281250	0	-1.021297363281250
1.234453247070313	-0.000000000000000	-1.234453247070313
1.234453247070313	-0.000000000000000	-1.234453247070313
1.234453247070313	-0.000000000000001	-1.234453247070313
1.234453247070313	-0.000000000000001	-1.234453247070313
1.473628173828125	-0.000000000000001	-1.473628173828125
1.473628173828125	-0.000000000000001	-1.473628173828125
1.473628173828125	0	-1.473628173828125
1.473628173828125	0	-1.473628173828125

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

        1440
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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SECTION STRAIN AND CURVATURE output from Abaqus to Matlab (Record key 29)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\29.inp'],[S(1:a(end)-1),'\29.inp'],'f')
```

Run the input file 29.inp with Abaqus

```
!abaqus job=29
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('29.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('29.fil');
```

Obtain the desired output data

```
out = Rec29(Rec)
```

```
out =

   1.0e-03 *

   0.000012694722063   0.000086074493311  -0.000000114895408
  -0.000025384151975  -0.000040570554916  -0.000000552807102
  -0.000000008328333  -0.131885171867907  -0.000000324733953
  -0.000021650775544  -0.092998838226777   0.000000242440629
   0.132190703837461   0.000177288669079   0.000000504673313
   0.225473796190126   0.000125156077502   0.000001299921044
   0.066112226358448  -0.065901564084925   0.000000275614599
  -0.000010531242853   0.000225217874572  -0.000000586479502
   0.112739829083668  -0.112540554255247   0.000000528289335
   0.066068903466366   0.066172069637105  -0.000000747751572
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    10
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

```
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/
```

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CONCRETE FAILURE output from Abaqus to Matlab (Record key 31)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\31.inp'],[S(1:a(end)-1),'\31.inp'],'f')
```

Run the input file 31.inp with Abaqus

```
!abaqus job=31
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('31.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('31.fil');
```

Obtain the desired output data

```
out = Rec31(Rec)
```

```
out =

    [  1]    ''
    [  2]    ''
    [  3]    ''
    [  4]    ''
    [  5]    ''
    [  6]    ''
    [  7]    ''
    [  8]    ''
    [  9]    ''
    [ 10]    ''
    [ 11]    ''
    [ 12]    ''
    [ 13]    ''
    [ 14]    ''
    [ 15]    ''
    [ 16]    ''
    [ 17]    '1 CRACK'
    [ 18]    '1 CRACK'
    [ 19]    '1 CRACK'
    [ 20]    '1 CRACK'
    [ 21]    '1 CRACK'
    [ 22]    '1 CRACK'
    [ 23]    '1 CRACK'
    [ 24]    '1 CRACK'
    [ 25]    '1 CRACK'
    [ 26]    '1 CRACK'
    [ 27]    '1 CRACK'
    [ 28]    '1 CRACK'
    [ 29]    '1 CRACK'
    [ 30]    '1 CRACK'
    [ 31]    '1 CRACK'
    [ 32]    '1 CRACK'
    [ 33]    '1 CRACK'
    [ 34]    '1 CRACK'
    [ 35]    '1 CRACK'
    [ 36]    '1 CRACK'
    [ 37]    '1 CRACK'
    [ 38]    '1 CRACK'
    [ 39]    '1 CRACK'
    [ 40]    '1 CRACK'
    [ 41]    '1 CRACK'
    [ 42]    '1 CRACK'
    [ 43]    '1 CRACK'
    [ 44]    '1 CRACK'
    [ 45]    '1 CRACK'
    [ 46]    '1 CRACK'
    [ 47]    '1 CRACK'
    [ 48]    '1 CRACK'
    [ 49]    '1 CRACK'
    [ 50]    '1 CRACK'
    [ 51]    '1 CRACK'
    [ 52]    '1 CRACK'
    [ 53]    '1 CRACK'
    [ 54]    '1 CRACK'
    [ 55]    '1 CRACK'
    [ 56]    '1 CRACK'
    [ 57]    '1 CRACK'
```

```
[ 58]    '1 CRACK'
[ 59]    '1 CRACK'
[ 60]    '1 CRACK'
[ 61]    '1 CRACK'
[ 62]    '1 CRACK'
[ 63]    '1 CRACK'
[ 64]    '1 CRACK'
[ 65]    '1 CRACK'
[ 66]    '1 CRACK'
[ 67]    '1 CRACK'
[ 68]    '1 CRACK'
[ 69]    '1 CRACK'
[ 70]    '1 CRACK'
[ 71]    '1 CRACK'
[ 72]    '1 CRACK'
[ 73]    '1 CRACK'
[ 74]    '1 CRACK'
[ 75]    '1 CRACK'
[ 76]    '1 CRACK'
[ 77]    '1 CRACK'
[ 78]    '1 CRACK'
[ 79]    '1 CRACK'
[ 80]    '1 CRACK'
[ 81]    '1 CRACK'
[ 82]    '1 CRACK'
[ 83]    '1 CRACK'
[ 84]    '1 CRACK'
[ 85]    '1 CRACK'
[ 86]    '1 CRACK'
[ 87]    '1 CRACK'
[ 88]    '1 CRACK'
[ 89]    '1 CRACK'
[ 90]    '1 CRACK'
[ 91]    '1 CRACK'
[ 92]    '1 CRACK'
[ 93]    '1 CRACK'
[ 94]    '1 CRACK'
[ 95]    '1 CRACK'
[ 96]    '1 CRACK'
[ 97]    '1 CRACK'
[ 98]    '1 CRACK'
[ 99]    '1 CRACK'
[100]    '1 CRACK'
[101]    '1 CRACK'
[102]    '1 CRACK'
[103]    '1 CRACK'
[104]    '1 CRACK'
[105]    '1 CRACK'
[106]    '1 CRACK'
[107]    '1 CRACK'
[108]    '1 CRACK'
[109]    '1 CRACK'
[110]    '1 CRACK'
[111]    '1 CRACK'
[112]    '1 CRACK'
[113]    '1 CRACK'
[114]    '1 CRACK'
[115]    '1 CRACK'
[116]    '1 CRACK'
[117]    '1 CRACK'
[118]    '1 CRACK'
```

```
    [119]    '1 CRACK'
    [120]    '1 CRACK'
    [121]    '1 CRACK'
    [122]    '1 CRACK'
    [123]    '1 CRACK'
    [124]    '1 CRACK'
    [125]    '1 CRACK'
    [126]    '1 CRACK'
    [127]    '1 CRACK'
    [128]    '1 CRACK'
    [129]    '1 CRACK'
    [130]    '1 CRACK'
    [131]    '1 CRACK'
    [132]    '1 CRACK'
    [133]    '1 CRACK'
    [134]    '1 CRACK'
    [135]    '1 CRACK'
    [136]    '1 CRACK'
    [137]    '1 CRACK'
    [138]    '1 CRACK'
    [139]    '1 CRACK'
    [140]    '1 CRACK'
    [141]    '1 CRACK'
    [142]    '1 CRACK'
    [143]    '1 CRACK'
    [144]    '1 CRACK'
    [145]    '1 CRACK'
    [146]    '1 CRACK'
    [147]    '1 CRACK'
    [148]    '1 CRACK'
    [149]    '1 CRACK'
    [150]    '1 CRACK'
    [151]    '1 CRACK'
    [152]    '1 CRACK'
    [153]    '1 CRACK'
    [154]    '1 CRACK'
    [155]    '1 CRACK'
    [156]    '1 CRACK'
    [157]    '1 CRACK'
    [158]    '1 CRACK'
    [159]    '1 CRACK'
    [160]    '1 CRACK'
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   160
```

Check class of output

```
cOut=class(out)
```

```
cOut =

cell
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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STRAIN JUMP AT NODES output from Abaqus to Matlab (Record key 32)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\32.inp'],[S(1:a(end)-1),'\32.inp'],'f')
```

Run the input file 32.inp with Abaqus

```
!abaqus job=32
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('32.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('32.fil');
```

Obtain the desired output data

```
out = Rec32(Rec)
```

STRAIN JUMP AT NODES output from Abaqus to Matlab (Record key 32)

```
out =

                   0                   0                   0
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0                   0                   0
                   0   0.000000000000000   0.000000000000000
   0.000000000000000                   0   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0                   0                   0
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
   0.000000000000000                   0   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0                   0                   0
                   0   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0                   0                   0
   0.000000000000000   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
   0.000000000000000                   0   0.000000000000000
   0.000000000000000                   0   0.000000000000000
                   0                   0                   0
                   0                   0   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0                   0   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0                   0                   0
   0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000   0.000000000000000
                   0                   0                   0
                   0                   0                   0
```

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0.000098295087060	0.000000000000000	0.000000000000000
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0.000100036621689	0.001997951404895	0.000802255600236
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0	0.000408815395812	0.000000000000000
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0.000100036621689	0.001997951404895	0.000802255600236
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0.000098295087060	0.000000000000000	0.000000000000000
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0.000137472486355	0.002745627977144	0.001102476974881
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0.000135079231851	0.000000000000000	0.000000000000000
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0.000174138518737	0.003477929305123	0.001396524587847
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0.000000000000000	0.000711644458417	0.000000000000000
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0.000174138518737	0.003477929305123	0.001396524587847
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0.000171106946345	0.000000000000000	0.000000000000000
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0.000207129487864	0.000000000000000	0.000000000000000
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0.000210799286493	0.004210125486942	0.001690529980518
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0.000000000000000	0.000861464454613	0.000000000000000
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0.000210799286493	0.004210125486942	0.001690529980518
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0.000207129487864	0.000000000000000	0.000000000000000
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0.000243152007724	0.000000000000000	0.000000000000000
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0.000247460032205	0.004942321228502	0.001984535196409
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0.000284120777719	0.005674516966085	0.002278540410703
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0.000284120777719	0.005674516966085	0.002278540410703
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0.000357442268743	0.007138908441204	0.002866550839272
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0.000504085250791	0.010067691391442	0.004042571696409
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0.000495309645366	0.000000000000000	0.000000000000000
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0	0	0

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0.000540745996303	0.010799887129001	0.004336576910693
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0	0.002209843603077	0.000000000000000
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0.000540745996303	0.010799887129001	0.004336576910693
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0.000531332165029	0.000000000000000	0.000000000000000
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0.000577406741815	0.011532082866560	0.004630582124977
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0.000577406741815	0.011532082866560	0.004630582124977
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0	0	0
0	0.002509483413664	0.000000000000000
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0.000614067487327	0.012264278604120	0.004924587339261
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0.000614067487327	0.012264278604120	0.004924587339261
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0	0.002659303318957	0
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0.000639399724018	0.000000000000000	0.000000000000000
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0	0	0
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0.000711444763344	0	0.000000000000000
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

STRAIN JUMP AT NODES output from Abaqus to Matlab (Record key 32)

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0.000747467283007	0.000000000000000	0.000000000000000
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0.000000000000000	0.003108763034838	0.000000000000000
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0.000760710469376	0.015193061554357	0.006100608196398
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0.000000000000000	0.003108763034838	0.000000000000000
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0.000760710469376	0.015193061554357	0.006100608196398
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0.000747467283007	0.000000000000000	0.000000000000000
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0	0	0
0	0	0
0	0	0
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0.000783489802670	0.000000000000000	0.000000000000000
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0.000797371214888	0.015925257291917	0.006394613410683
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0	0.003258582940131	0.000000000000000
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0.000797371214888	0.015925257291917	0.006394613410683
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0.000783489802670	0.000000000000000	0.000000000000000
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0	0	0
0	0	0
0	0	0
0	0	0
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0	0	0
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0.000834031960400	0.016657453029476	0.006688618624967
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0.000000000000000	0.003408402845424	0.000000000000000
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0.000834031960400	0.016657453029476	0.006688618624967
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0.014853654830756	0.022040650998409	0.007897416018663
0.000000000000000	0.001651597057579	0.000000000000000
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0.024202928894623	0.023184475197268	0.010750068628476
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0.026814136299408	0.025294622668776	0.011918891241150
0.000000000000000	0.000135002451179	0.000000000000000
0	0.000135002451179	0.000000000000000
0.026814136299408	0.025294622668776	0.011918891241150
0.026814136299408	0.025294622668776	0.011918891241150
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0.027564182119687	0.026002164559893	0.012252286823539
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0.028314227891905	0.026709706452670	0.012585682383482
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0.009692960166051	0	0.000000000000000
0.009692960166051	0.000000000000000	0.000000000000000

STRAIN JUMP AT NODES output from Abaqus to Matlab (Record key 32)

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0.029064273663877	0.027417248345456	0.012919077943309
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0.000000000000000	0.000150107632166	0.000000000000000
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0.029814319435848	0.028124790238242	0.013252473503137
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0.032064456751761	0.030247415916600	0.014252660182619
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0.000000000000000	0.000172765387965	0.000000000000000
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0.034314594067674	0.032370041594958	0.015252846862101
0.034314594067674	0.032370041594958	0.015252846862101
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0.011443946518628	0.000000000000000	0.000000000000000
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0.035064639839645	0.033077583487744	0.015586242421928
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0.000000000000000	0.000180317973231	0.000000000000000
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0.000000000000000	0.000164268729540	0.000000000000000
0.000000000000000	0.000164268729540	0.000000000000000
0.032626991080739	0.030778072336189	0.014502706852489
0.032626991080739	0.030778072336189	0.014502706852489
0.000000000000000	0.000164268729540	0.000000000000000
0	0	0

0.010881129476729	0	0.000000000000000
0.010881129476729	0.000000000000000	0.000000000000000
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0.011381411291751	0.000000000000000	0.000000000000000
0.011381411291751	0.000000000000000	0.000000000000000
0	0	0
0.000000000000000	0.000171821314807	0.000000000000000
0.034127082624682	0.032193156121761	0.015169497972144
0.034127082624682	0.032193156121761	0.015169497972144
0.000000000000000	0.000171821314807	0.000000000000000
0.000000000000000	0.000171821314807	0.000000000000000
0.034127082624681	0.032193156121761	0.015169497972144
0.034127082624681	0.032193156121761	0.015169497972144
0.000000000000000	0.000171821314807	0.000000000000000
0	0	0
0.011381411291751	0.000000000000000	0.000000000000000
0.011381411291751	0.000000000000000	0.000000000000000
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0.011881693106773	0.000000000000000	0
0.011881693106773	0.000000000000000	0.000000000000000
0	0	0
0.000000000000000	0.000179373900073	0.000000000000000
0.035627174168624	0.033608239907333	0.015836289091799
0.035627174168624	0.033608239907333	0.015836289091799
0.000000000000000	0.000179373900073	0.000000000000000
0	0.000179373900073	0.000000000000000
0.035627174168624	0.033608239907333	0.015836289091799
0.035627174168624	0.033608239907333	0.015836289091799
0	0.000179373900073	0.000000000000000
0	0	0
0.011881693106773	0	0.000000000000000
0.011881693106773	0.000000000000000	0.000000000000000
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0.012381974921795	0.000000000000000	0
0.012381974921795	0.000000000000000	0.000000000000000
0	0	0
0.000000000000000	0.000186926485339	0.000000000000000
0.037127265712566	0.035023323692905	0.016503080211453
0.037127265712566	0.035023323692905	0.016503080211453
0.000000000000000	0.000186926485339	0.000000000000000
0.000000000000000	0.000186926485339	0.000000000000000
0.037127265712566	0.035023323692905	0.016503080211453
0.037127265712566	0.035023323692905	0.016503080211453
0.000000000000000	0.000186926485339	0.000000000000000
0	0	0
0.012381974921795	0.000000000000000	0.000000000000000

```
    0.012381974921795   0.000000000000000   0.000000000000000
                    0                   0                   0
                    0                   0                   0
                    0                   0                   0
                    0                   0                   0
                    0                   0                   0
                    0                   0                   0
    0.012507045375550   0.000000000000000                    0
    0.012507045375550   0.000000000000000   0.000000000000000
                    0                   0                   0
    0.000000000000000   0.000188814631656   0.000000000000000
    0.037502288598551   0.035377094639298   0.016669777991367
    0.037502288598551   0.035377094639298   0.016669777991367
    0.000000000000000   0.000188814631656   0.000000000000000
    0.000000000000000   0.000188814631656   0.000000000000000
    0.037502288598551   0.035377094639298   0.016669777991367
    0.037502288598551   0.035377094639298   0.016669777991367
    0.000000000000000   0.000188814631656   0.000000000000000
                    0                   0                   0
    0.012507045375550   0.000000000000000   0.000000000000000
    0.012507045375550   0.000000000000000   0.000000000000000
                    0                   0                   0
                    0                   0                   0
                    0                   0                   0
                    0                   0                   0
                    0                   0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

        2080
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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FILM output from Abaqus to Matlab (Record key 33)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\33.inp'],[S(1:a(end)-1),'\33.inp'],'f')
```

Run the input file 33.inp with Abaqus

```
!abaqus job=33
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('33.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('33.fil');
```

Obtain the desired output data

```
out = Rec33(Rec)
```

```
out =

    'F3'    [1.027777777777778e+02]    [10.100417062194371]
    'F3'    [1.055555555555556e+02]    [10.164190288730330]
    'F3'    [1.083333333333333e+02]    [10.212181782267420]
    'F3'    [1.111111111111111e+02]    [10.252336339678410]
    'F3'    [1.138888888888889e+02]    [10.288037960673581]
    'F3'    [1.166666666666667e+02]    [10.320922595520500]
    'F3'    [1.194444444444444e+02]    [10.351882367172490]
    'F3'    [1.222222222222222e+02]    [10.381455695401259]
    'F3'    [                  125]    [10.409994139231360]
    'F3'    [1.277777777777778e+02]    [10.437741214799630]
    'F3'    [1.305555555555555e+02]    [10.464873275585290]
    'F3'    [1.333333333333333e+02]    [10.491522501639800]
    'F3'    [1.361111111111111e+02]    [10.517790715834670]
    'F3'    [1.388888888888889e+02]    [10.543758142176690]
    'F3'    [1.416666666666667e+02]    [10.569489200392409]
    'F3'    [1.444444444444445e+02]    [10.595036478890851]
    'F3'    [1.472222222222222e+02]    [10.620443513628230]
    'F3'    [                  150]    [10.645746839147860]
    'F3'    [1.527777777777778e+02]    [10.670977439641771]
    'F3'    [1.555555555555555e+02]    [10.696161889076960]
    'F3'    [1.583333333333333e+02]    [10.721323176774501]
    'F3'    [1.611111111111111e+02]    [10.746481371848510]
    'F3'    [1.638888888888889e+02]    [10.771654122210901]
    'F3'    [1.666666666666667e+02]    [10.796857059617009]
    'F3'    [1.694444444444445e+02]    [10.822104109608070]
    'F3'    [1.722222222222222e+02]    [10.847407755024021]
    'F3'    [                  175]    [10.872779230591931]
    'F3'    [1.777777777777778e+02]    [10.898228704061170]
    'F3'    [1.805555555555555e+02]    [10.923765398426960]
    'F3'    [1.833333333333333e+02]    [10.949397724016819]
    'F3'    [1.861111111111111e+02]    [10.975133354960500]
    'F3'    [1.888888888888889e+02]    [11.000979329948681]
    'F3'    [1.916666666666667e+02]    [11.026942099798950]
    'F3'    [1.944444444444445e+02]    [11.053027607127451]
    'F3'    [1.972222222222222e+02]    [11.079241315747449]
    'F3'    [                  200]    [11.105588275202070]
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    36
```

Check class of output

```
cOut=class(out)
```

```
cOut =

cell
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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RADIATION output from Abaqus to Matlab (Record key 34)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\34.inp'],[S(1:a(end)-1),'\34.inp'],'f')
```

Run the input file 34.inp with Abaqus

```
!abaqus job=34
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('34.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('34.fil');
```

Obtain the desired output data

```
out = Rec34(Rec)
```

```
out =

    'R1'    [75]    [5.000000000000000e-14]
    'R2'    [75]    [5.000000000000000e-14]
    'R3'    [75]    [5.000000000000000e-14]
    'R4'    [75]    [5.000000000000000e-14]
    'R5'    [75]    [5.000000000000000e-14]
    'R6'    [75]    [5.000000000000000e-14]
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =

cell
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

RADIATION output from Abaqus to Matlab (Record key 34)

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SATURATION (PORE PRESSURE ANALYSIS) output from Abaqus to Matlab (Record key 35)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\35.inp'],[S(1:a(end)-1),'\35.inp'],'f')
```

Run the input file 35.inp with Abaqus

```
!abaqus job=35
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('35.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('35.fil');
```

Obtain the desired output data

```
out = Rec35(Rec)
```

```
out =

   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
   0.050000000000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     1
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    40
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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MASS CONCENTRATION (MASS DIFFUSION ANALYSIS) output from Abaqus to Matlab (Record key 38)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\38.inp'],[S(1:a(end)-1),'\38.inp'],'f')
```

Run the input file 38.inp with Abaqus

```
!abaqus job=38
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('38.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('38.fil');
```

Obtain the desired output data

```
out = Rec38(Rec)
```

```
out =

   1.0e+04 *

                   0
                   0
   4.874005468750000
                   0
   4.874005468750000
   1.624668457031250
   2.785145898437500
   2.785145898437500
   0.000000000000001
   2.785145898437500
   0.000000000000001
   0.000000000000000
                   0
   5.570291796875000
   5.570291796875000
                   0
   5.570291796875000
                   0
                   0
                   0
   2.785145898437500
                   0
   2.785145898437500
   2.785145898437500
   5.570291796875000
                   0
                   0
   5.570291796875000
                   0
   5.570291796875000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     1
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    30
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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GEL (PORE PRESSURE ANALYSIS) output from Abaqus to Matlab (Record key 40)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\40.inp'],[S(1:a(end)-1),'\40.inp'],'f')
```

Run the input file 40.inp with Abaqus

```
!abaqus job=40
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('40.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('40.fil');
```

Obtain the desired output data

```
out = Rec40(Rec)
```

```
out =

   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
   0.068068183958530
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     1
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    40
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


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TOTAL FLUID VOLUME RATIO output from Abaqus to Matlab (Record key 43)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\43.inp'],[S(1:a(end)-1),'\43.inp'],'f')
```

Run the input file 43.inp with Abaqus

```
!abaqus job=43
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('43.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('43.fil');
```

Obtain the desired output data

```
out = Rec43(Rec)
```

```
out =

   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
   0.109734834730625
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     1
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    40
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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ELEMENT STATUS output from Abaqus to Matlab (Record key 61)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\61.inp'],[S(1:a(end)-1),'\61.inp'],'f')
```

Run the input file 61.inp with Abaqus

```
!abaqus job=61
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('61.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('61.fil');
```

Obtain the desired output data

```
out = Rec61(Rec)
```

```
out =

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```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     1
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   587
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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AVERAGE SHELL SECTION STRESS output from Abaqus to Matlab (Record key 83)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\83.inp'],[S(1:a(end)-1),'\83.inp'],'f')
```

Run the input file 83.inp with Abaqus

```
!abaqus job=83
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('83.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('83.fil');
```

Obtain the desired output data

```
out = Rec83(Rec)
```

```
out =

   1.0e+03 *

  Columns 1 through 3

  -1.000000000000000  -1.000000000000000  -1.000000000000000

  Columns 4 through 6

   0.000000000000000  -0.000000000000000  -0.000000000000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     1
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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THERMAL STRAIN output from Abaqus to Matlab (Record key 88)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\88.inp'],[S(1:a(end)-1),'\88.inp'],'f')
```

Run the input file 88.inp with Abaqus

```
!abaqus job=88
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('88.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('88.fil');
```

Obtain the desired output data

```
out = Rec88(Rec)
```

```
out =

  Columns 1 through 3

   4.119994060286766   4.119994060286766   4.119994060286766
   4.119994060286766   4.119994060286766   4.119994060286766
   4.119994060286766   4.119994060286766   4.119994060286766
   4.119994060286766   4.119994060286766   4.119994060286766
  -0.000000000000002  -0.000000000000002  -0.000000000000002
  -0.000000000000002  -0.000000000000002  -0.000000000000002
  -0.000000000000002  -0.000000000000002  -0.000000000000002
  -0.000000000000002  -0.000000000000002  -0.000000000000002
   0.001584853620938   0.001584853620938   0.001584853620938
   0.001584853620938   0.001584853620938   0.001584853620938
   0.001584853620939   0.001584853620939   0.001584853620939
   0.001584853620939   0.001584853620939   0.001584853620939
   0.005914754235903   0.005914754235903   0.005914754235903
   0.005914754235903   0.005914754235903   0.005914754235903
   0.005914754235904   0.005914754235904   0.005914754235904
   0.005914754235904   0.005914754235904   0.005914754235904
   0.004999738571228   0.004999738571228   0.004999738571228
   0.004999738571228   0.004999738571228   0.004999738571228
   0.002499869285614   0.002499869285614   0.002499869285614
   0.002499869285614   0.002499869285614   0.002499869285614
   0.004999738571228   0.004999738571228   0.004999738571228
   0.004999738571228   0.004999738571228   0.004999738571228
   0.002499869285614   0.002499869285614   0.002499869285614
   0.002499869285614   0.002499869285614   0.002499869285614
   0.002499869285614   0.002499869285614   0.002499869285614
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   0.004999738571228   0.004999738571228   0.004999738571228
   0.004999738571228   0.004999738571228   0.004999738571228
   0.002499869285614   0.002499869285614   0.002499869285614
   0.002499869285614   0.002499869285614   0.002499869285614
   0.004999738571228   0.004999738571228   0.004999738571228
   0.004999738571228   0.004999738571228   0.004999738571228
   0.001341306417545   0.001341306417545   0.001341306417545
   0.001341306417545   0.001341306417545   0.001341306417545
   0.001341305734988   0.001341305734988   0.001341305734988
   0.001341305734988   0.001341305734988   0.001341305734988
   0.005005832259677   0.005005832259677   0.005005832259677
   0.005005832259677   0.005005832259677   0.005005832259677
   0.005005832259677   0.005005832259677   0.005005832259677
   0.005005832259677   0.005005832259677   0.005005832259677
   0.004231415591213   0.004231415591213   0.004231415591213
   0.004231415591213   0.004231415591213   0.004231415591213
   0.002115707791890   0.002115707791890   0.002115707791890
   0.002115707791890   0.002115707791890   0.002115707791890
   0.004231415907615   0.004231415907615   0.004231415907615
   0.004231415907615   0.004231415907615   0.004231415907615
   0.002115709015223   0.002115709015223   0.002115709015223
   0.002115709015223   0.002115709015223   0.002115709015223
   0.002115706892392   0.002115706892392   0.002115706892392
   0.002115706892392   0.002115706892392   0.002115706892392
   0.004231415907615   0.004231415907615   0.004231415907615
   0.004231415907615   0.004231415907615   0.004231415907615
   0.002115709015223   0.002115709015223   0.002115709015223
   0.002115709015223   0.002115709015223   0.002115709015223
   0.004231415907615   0.004231415907615   0.004231415907615
```

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   0.004231415907615   0.004231415907615   0.004231415907615
   4.393150617106397   4.393150617106397   4.393150617106397
   4.393150617106397   4.393150617106397   4.393150617106397
   4.393150617106397   4.393150617106397   4.393150617106397
   4.393150617106397   4.393150617106397   4.393150617106397
   1.177141160081932   1.177141160081932   1.177141160081932
   1.177141160081932   1.177141160081932   1.177141160081932
   1.177141160081933   1.177141160081933   1.177141160081933
   1.177141160081933   1.177141160081933   1.177141160081933
   3.713527851458884   3.713527851458884   3.713527851458884
   3.713527851458884   3.713527851458884   3.713527851458884
   1.856763925729442   1.856763925729442   1.856763925729442
   1.856763925729442   1.856763925729442   1.856763925729442
   3.713527851458867   3.713527851458867   3.713527851458867
   3.713527851458867   3.713527851458867   3.713527851458867
   1.856763925729463   1.856763925729463   1.856763925729463
   1.856763925729463   1.856763925729463   1.856763925729463
   1.856763925729442   1.856763925729442   1.856763925729442
   1.856763925729442   1.856763925729442   1.856763925729442
   3.713527851458886   3.713527851458886   3.713527851458886
   3.713527851458886   3.713527851458886   3.713527851458886
   1.856763925729461   1.856763925729461   1.856763925729461
   1.856763925729461   1.856763925729461   1.856763925729461
   3.713527851458867   3.713527851458867   3.713527851458867
   3.713527851458867   3.713527851458867   3.713527851458867

  Columns 4 through 6

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```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =
```

```
     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    80
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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LOGARITHMIC STRAIN output from Abaqus to Matlab (Record key 89)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\89.inp'],[S(1:a(end)-1),'\89.inp'],'f')
```

Run the input file 89.inp with Abaqus

```
!abaqus job=89
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('89.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('89.fil');
```

Obtain the desired output data

```
out = Rec89(Rec)
```

```
out =

  Columns 1 through 3

  -0.001185294741514  -0.001185294741505   0.004071648433160
  -0.001185294741514  -0.001185294741505   0.004071648433160
  -0.001185294741514  -0.001185294741505   0.004071648433160
  -0.001185294741514  -0.001185294741505   0.004071648433160
  -0.000802500467246  -0.000802500467243   0.003306059931624
  -0.000802500467246  -0.000802500467243   0.003306059931624
  -0.000802500467246  -0.000802500467243   0.003306059931624
  -0.000802500467246  -0.000802500467243   0.003306059931624
  -0.000183899057416  -0.000183899057416   0.000603315014784
  -0.000183899057416  -0.000183899057416   0.000603315014784
  -0.000183899057416  -0.000183899057416   0.000603315014784
  -0.000183899057416  -0.000183899057416   0.000603315014784
  -0.000124535041688  -0.000124535041683   0.000484587002058
  -0.000124535041688  -0.000124535041683   0.000484587002058
  -0.000124535041688  -0.000124535041683   0.000484587002058
  -0.000124535041688  -0.000124535041683   0.000484587002058
  -0.000947760412547  -0.000947760412543   0.003301136823184
  -0.000947760412547  -0.000947760412543   0.003301136823184
  -0.000947760412547  -0.000947760412543   0.003301136823184
  -0.000947760412547  -0.000947760412543   0.003301136823184
  -0.000641711155338  -0.000641711155333   0.002689038417099
  -0.000641711155338  -0.000641711155333   0.002689038417099
  -0.000641711155338  -0.000641711155333   0.002689038417099
  -0.000641711155338  -0.000641711155333   0.002689038417099
  -0.000394717061386  -0.000394717061382   0.001277779911872
  -0.000394717061386  -0.000394717061382   0.001277779911872
  -0.000394717061386  -0.000394717061382   0.001277779911872
  -0.000394717061386  -0.000394717061382   0.001277779911872
  -0.000267287312737  -0.000267287312737   0.001022920431796
  -0.000267287312737  -0.000267287312737   0.001022920431796
  -0.000267287312737  -0.000267287312737   0.001022920431796
  -0.000267287312737  -0.000267287312737   0.001022920431796
  -0.000731899161927  -0.000731899161918   0.002636490374116
  -0.000731899161927  -0.000731899161918   0.002636490374116
  -0.000731899161927  -0.000731899161918   0.002636490374116
  -0.000731899161927  -0.000731899161918   0.002636490374116
  -0.000495578376433  -0.000495578376430   0.002163848964594
  -0.000495578376433  -0.000495578376430   0.002163848964594
  -0.000495578376433  -0.000495578376430   0.002163848964594
  -0.000495578376433  -0.000495578376430   0.002163848964594

  Columns 4 through 6

   0.000000164458984  -0.000574518727898  -0.000574518727897
  -0.000000164458984   0.000574518727898  -0.000574518727897
  -0.000000164458984  -0.000574518727898   0.000574518727897
   0.000000164458984   0.000574518727898   0.000574518727897
   0.000000164207744  -0.000573860374766  -0.000573860374766
  -0.000000164207744   0.000573860374766  -0.000573860374766
  -0.000000164207744  -0.000573860374766   0.000573860374766
   0.000000164207744   0.000573860374766   0.000573860374766
   0.000000003963222  -0.000089053946200  -0.000089053946200
  -0.000000003963222   0.000089053946200  -0.000089053946200
  -0.000000003963222  -0.000089053946200   0.000089053946200
   0.000000003963222   0.000089053946200   0.000089053946200
```

```
    0.000000003962277  -0.000089038093054  -0.000089038093053
   -0.000000003962277   0.000089038093054  -0.000089038093053
   -0.000000003962277  -0.000089038093054   0.000089038093053
    0.000000003962277   0.000089038093054   0.000089038093053
    0.000000105172489  -0.000459283399128  -0.000459283399128
   -0.000000105172489   0.000459283399128  -0.000459283399128
   -0.000000105172489  -0.000459283399128   0.000459283399128
    0.000000105172489   0.000459283399128   0.000459283399128
    0.000000105043986  -0.000458862423536  -0.000458862423535
   -0.000000105043986   0.000458862423536  -0.000458862423535
   -0.000000105043986  -0.000458862423536   0.000458862423535
    0.000000105043986   0.000458862423536   0.000458862423535
    0.000000018254737  -0.000191181067302  -0.000191181067302
   -0.000000018254737   0.000191181067302  -0.000191181067302
   -0.000000018254737  -0.000191181067302   0.000191181067302
    0.000000018254737   0.000191181067302   0.000191181067302
    0.000000018245441  -0.000191108028403  -0.000191108028403
   -0.000000018245445   0.000191108028403  -0.000191108028403
   -0.000000018245441  -0.000191108028403   0.000191108028403
    0.000000018245445   0.000191108028403   0.000191108028403
    0.000000062731818  -0.000354606222599  -0.000354606222598
   -0.000000062731818   0.000354606222599  -0.000354606222598
   -0.000000062731818  -0.000354606222599   0.000354606222598
    0.000000062731818   0.000354606222599   0.000354606222598
    0.000000062672616  -0.000354355162305  -0.000354355162305
   -0.000000062672616   0.000354355162305  -0.000354355162305
   -0.000000062672616  -0.000354355162305   0.000354355162305
    0.000000062672616   0.000354355162305   0.000354355162305
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    40
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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NOMINAL STRAIN output from Abaqus to Matlab (Record key 90)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\90.inp'],[S(1:a(end)-1),'\90.inp'],'f')
```

Run the input file 90.inp with Abaqus

```
!abaqus job=90
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('90.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('90.fil');
```

Obtain the desired output data

```
out = Rec90(Rec)
```

```
out =

  Columns 1 through 3

  -0.001184551274751  -0.001184551274742   0.004080031564903
  -0.001184551274751  -0.001184551274742   0.004080031564903
  -0.001184551274751  -0.001184551274742   0.004080031564903
  -0.001184551274751  -0.001184551274742   0.004080031564903
  -0.000802137362025  -0.000802137362022   0.003311613463860
  -0.000802137362025  -0.000802137362022   0.003311613463860
  -0.000802137362025  -0.000802137362022   0.003311613463860
  -0.000802137362025  -0.000802137362022   0.003311613463860
  -0.000183881157617  -0.000183881157617   0.000603499029220
  -0.000183881157617  -0.000183881157617   0.000603499029220
  -0.000183881157617  -0.000183881157617   0.000603499029220
  -0.000183881157617  -0.000183881157617   0.000603499029220
  -0.000124526296471  -0.000124526296466   0.000484706415811
  -0.000124526296471  -0.000124526296466   0.000484706415811
  -0.000124526296471  -0.000124526296466   0.000484706415811
  -0.000124526296471  -0.000124526296466   0.000484706415811
  -0.000947285049473  -0.000947285049469   0.003306644410820
  -0.000947285049473  -0.000947285049469   0.003306644410820
  -0.000947285049473  -0.000947285049469   0.003306644410820
  -0.000947285049473  -0.000947285049469   0.003306644410820
  -0.000641478971084  -0.000641478971079   0.002692709845660
  -0.000641478971084  -0.000641478971079   0.002692709845660
  -0.000641478971084  -0.000641478971079   0.002692709845660
  -0.000641478971084  -0.000641478971079   0.002692709845660
  -0.000394634601336  -0.000394634601332   0.001278605764580
  -0.000394634601336  -0.000394634601332   0.001278605764580
  -0.000394634601336  -0.000394634601332   0.001278605764580
  -0.000394634601336  -0.000394634601332   0.001278605764580
  -0.000267247028637  -0.000267247028637   0.001023452929323
  -0.000267247028637  -0.000267247028637   0.001023452929323
  -0.000267247028637  -0.000267247028637   0.001023452929323
  -0.000267247028637  -0.000267247028637   0.001023452929323
  -0.000731615664719  -0.000731615664710   0.002640000455311
  -0.000731615664719  -0.000731615664710   0.002640000455311
  -0.000731615664719  -0.000731615664710   0.002640000455311
  -0.000731615664719  -0.000731615664710   0.002640000455311
  -0.000495439895664  -0.000495439895662   0.002166223207316
  -0.000495439895664  -0.000495439895662   0.002166223207316
  -0.000495439895664  -0.000495439895662   0.002166223207316
  -0.000495439895664  -0.000495439895662   0.002166223207316

  Columns 4 through 6

   0.000000246828981  -0.000575349160565  -0.000575349160564
  -0.000000246828981   0.000575349160565  -0.000575349160564
  -0.000000246828981  -0.000575349160565   0.000575349160564
   0.000000246828981   0.000575349160565   0.000575349160564
   0.000000246451692  -0.000574579614813  -0.000574579614813
  -0.000000246451692   0.000574579614813  -0.000574579614813
  -0.000000246451692  -0.000574579614813   0.000574579614813
   0.000000246451692   0.000574579614813   0.000574579614813
   0.000000005945301  -0.000089072625929  -0.000089072625929
  -0.000000005945301   0.000089072625929  -0.000089072625929
  -0.000000005945301  -0.000089072625929   0.000089072625929
   0.000000005945301   0.000089072625929   0.000089072625929
```

```
    0.000000005943885  -0.000089054125191  -0.000089054125190
   -0.000000005943885   0.000089054125191  -0.000089054125190
   -0.000000005943885  -0.000089054125191   0.000089054125190
    0.000000005943885   0.000089054125191   0.000089054125190
    0.000000157832912  -0.000459824516623  -0.000459824516623
   -0.000000157832912   0.000459824516623  -0.000459824516623
   -0.000000157832912  -0.000459824516623   0.000459824516623
    0.000000157832912   0.000459824516623   0.000459824516623
    0.000000157639968  -0.000459332617250  -0.000459332617249
   -0.000000157639968   0.000459332617250  -0.000459332617249
   -0.000000157639968  -0.000459332617250   0.000459332617249
    0.000000157639968   0.000459332617250   0.000459332617249
    0.000000027386571  -0.000191265522137  -0.000191265522137
   -0.000000027386571   0.000191265522137  -0.000191265522137
   -0.000000027386571  -0.000191265522137   0.000191265522137
    0.000000027386571   0.000191265522137   0.000191265522137
    0.000000027372622  -0.000191180260537  -0.000191180260537
   -0.000000027372625   0.000191180260537  -0.000191180260537
   -0.000000027372622  -0.000191180260537   0.000191180260537
    0.000000027372625   0.000191180260537   0.000191180260537
    0.000000094134616  -0.000354944250472  -0.000354944250471
   -0.000000094134616   0.000354944250472  -0.000354944250471
   -0.000000094134616  -0.000354944250472   0.000354944250471
    0.000000094134616   0.000354944250472   0.000354944250471
    0.000000094045740  -0.000354650979541  -0.000354650979541
   -0.000000094045740   0.000354650979541  -0.000354650979541
   -0.000000094045740  -0.000354650979541   0.000354650979541
    0.000000094045740   0.000354650979541   0.000354650979541
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    40
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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MECHANICAL STRAIN RATE output from Abaqus to Matlab (Record key 91)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\91.inp'],[S(1:a(end)-1),'\91.inp'],'f')
```

Run the input file 91.inp with Abaqus

```
!abaqus job=91
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('91.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('91.fil');
```

Obtain the desired output data

```
out = Rec91(Rec)
```

```
out =

  Columns 1 through 3

  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.059999998484273  -0.059999998484273   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.061875805840828  -0.061875805840828   0.199999994947575
  -0.077009623055346  -0.077009623055346   0.199999994947575
  -0.077009623055346  -0.077009623055346   0.199999994947575
  -0.077009623055346  -0.077009623055346   0.199999994947575
  -0.077009623055346  -0.077009623055346   0.199999994947575
  -0.077009623055346  -0.077009623055346   0.199999994947575
  -0.077009623055346  -0.077009623055346   0.199999994947575
  -0.077009623055346  -0.077009623055346   0.199999994947575
```

-0.077009623055346	-0.077009623055346	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.089041364844888	-0.089041364844888	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.093245515017770	-0.093245515017770	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094408547738567	-0.094408547738567	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.094715745944995	-0.094715745944995	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.095322466222569	-0.095322466222569	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.098655968031380	-0.098655968031380	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099623277492356	-0.099623277492356	0.199999994947575
-0.099895609309897	-0.099895609309897	0.199999994947575
-0.099895609309897	-0.099895609309897	0.199999994947575
-0.099895609309897	-0.099895609309897	0.199999994947575
-0.099895609309897	-0.099895609309897	0.199999994947575

```
  -0.099895609309897  -0.099895609309897   0.199999994947575
  -0.099895609309897  -0.099895609309897   0.199999994947575
  -0.099895609309897  -0.099895609309897   0.199999994947575
  -0.099895609309897  -0.099895609309897   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099971148301847  -0.099971148301847   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099992037576158  -0.099992037576158   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099997800134588  -0.099997800134588   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999393569306  -0.099999393569306   0.199999994947575
  -0.099999830126763  -0.099999830126763   0.199999994947577
  -0.099999830126763  -0.099999830126763   0.199999994947577
  -0.099999830126763  -0.099999830126763   0.199999994947577
  -0.099999830126763  -0.099999830126763   0.199999994947577
  -0.099999830126763  -0.099999830126763   0.199999994947577
  -0.099999830126763  -0.099999830126763   0.199999994947577
  -0.099999830126763  -0.099999830126763   0.199999994947577
  -0.099999830126763  -0.099999830126763   0.199999994947577

  Columns 4 through 6

   0.000000000000000   0.000000000000000                   0
   0.000000000000000   0.000000000000000  -0.000000000000000
  -0.000000000000000   0.000000000000000  -0.000000000000000
   0.000000000000000   0.000000000000000  -0.000000000000000
  -0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000000   0.000000000000000  -0.000000000000000
  -0.000000000000000                   0                   0
                   0   0.000000000000000  -0.000000000000000
  -0.000000000000000  -0.000000000000000                   0
  -0.000000000000000  -0.000000000000000   0.000000000000000
   0.000000000000000                   0   0.000000000000000
  -0.000000000000000  -0.000000000000000   0.000000000000000
  -0.000000000000000  -0.000000000000000   0.000000000000000
```

-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	0	0.000000000000000
-0.000000000000000	0	0.000000000000000
0.000000000000000	-0.000000000000000	0
0.000000000000000	-0.000000000000000	0.000000000000000
0	-0.000000000000000	-0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	0	0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
0	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	-0.000000000000000
0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
0	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	-0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	-0.000000000000000
0.000000000000000	0.000000000000000	-0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	0	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	0	0
-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	-0.000000000000000	0
-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	0	0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	0.000000000000000	0
0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	0
0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0	0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0
-0.000000000000000	0.000000000000000	0.000000000000000

MECHANICAL STRAIN RATE output from Abaqus to Matlab (Record key 91)

0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	0
0.000000000000000	0	0
0.000000000000000	0	0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	0
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0	-0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0
-0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0	-0.000000000000000
0.000000000000000	0	0.000000000000000
0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
0	-0.000000000000000	0.000000000000000
-0.000000000000000	-0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	0.000000000000000
0.000000000000000	0.000000000000000	-0.000000000000000
0.000000000000000	0	0.000000000000000
0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	0.000000000000000	0.000000000000000
-0.000000000000000	0.000000000000000	-0.000000000000000
-0.000000000000000	0	0.000000000000000
-0.000000000000000	0	-0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
0	-0.000000000000000	-0.000000000000000
0.000000000000000	0	-0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	0
-0.000000000000000	-0.000000000000000	-0.000000000000000
0.000000000000000	-0.000000000000000	-0.000000000000000
-0.000000000000000	-0.000000000000000	-0.000000000000000
0	-0.000000000000000	0
-0.000000000000000	-0.000000000000000	-0.000000000000000

```
    0.000000000000000  -0.000000000000000                  0
                    0  -0.000000000000000  -0.000000000000000
    0.000000000000000   0.000000000000000   0.000000000000000
    0.000000000000000   0.000000000000000  -0.000000000000000
    0.000000000000000   0.000000000000000   0.000000000000000
    0.000000000000000   0.000000000000000  -0.000000000000000
   -0.000000000000000   0.000000000000000                  0
    0.000000000000000   0.000000000000000  -0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
                    0   0.000000000000000  -0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
   -0.000000000000000   0.000000000000000                  0
   -0.000000000000000   0.000000000000000   0.000000000000000
    0.000000000000000                   0   0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
   -0.000000000000000  -0.000000000000000   0.000000000000000
    0.000000000000000  -0.000000000000000   0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
   -0.000000000000000   0.000000000000000   0.000000000000000
    0.000000000000000  -0.000000000000000   0.000000000000000
    0.000000000000000  -0.000000000000000                  0
   -0.000000000000000   0.000000000000000   0.000000000000000
    0.000000000000000   0.000000000000000   0.000000000000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     6
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   160
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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PORE FLUID EFFECTIVE VELOCITY VECTOR output from Abaqus to Matlab (Record key 97)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\97.inp'],[S(1:a(end)-1),'\97.inp'],'f')
```

Run the input file 97.inp with Abaqus

```
!abaqus job=97
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('97.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('97.fil');
```

Obtain the desired output data

```
out = Rec97(Rec)
```

```
out =

   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000   0.000000000000001  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000   0.000000000000001  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000   0.000000000000001  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000   0.000000000000001  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000  -0.000000000000000  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000  -0.000000000000000  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000  -0.000000000000011  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000   0.000000000000010  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000  -0.000000000000004  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000                   0  -5.000000000000000
   5.000000000000000  -0.000000000000001  -5.000000000000000
   5.000000000000000  -0.000000000000002  -5.000000000000000
   5.000000000000000  -0.000000000000002  -5.000000000000000
   5.000000000000000   0.000000000000006  -5.000000000000000
   5.000000000000000  -0.000000000000002  -5.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000  -0.000000000000002 -10.000000000000000
  10.000000000000000   0.000000000000001 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000   0.000000000000001 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
  10.000000000000000  -0.000000000000002 -10.000000000000000
  10.000000000000000   0.000000000000001 -10.000000000000000
  10.000000000000000                   0 -10.000000000000000
```

```
   10.000000000000000   0.000000000000003 -10.000000000000000
   10.000000000000000                   0 -10.000000000000000
   10.000000000000000  -0.000000000000000 -10.000000000000000
   10.000000000000000  -0.000000000000001 -10.000000000000000
   10.000000000000000  -0.000000000000001 -10.000000000000000
   10.000000000000000                   0 -10.000000000000000
   10.000000000000000  -0.000000000000001 -10.000000000000000
   10.000000000000000  -0.000000000000001 -10.000000000000000
   10.000000000000000  -0.000000000000001 -10.000000000000000
   10.000000000000000  -0.000000000000022 -10.000000000000000
   10.000000000000000                   0 -10.000000000000000
   10.000000000000000   0.000000000000020 -10.000000000000000
   10.000000000000000                   0 -10.000000000000000
   10.000000000000000                   0 -10.000000000000000
   10.000000000000000  -0.000000000000009 -10.000000000000000
   10.000000000000000  -0.000000000000003 -10.000000000000000
   10.000000000000000                   0 -10.000000000000000
   10.000000000000000  -0.000000000000003 -10.000000000000000
   10.000000000000000  -0.000000000000005 -10.000000000000000
   10.000000000000000  -0.000000000000005 -10.000000000000000
   10.000000000000000   0.000000000000013 -10.000000000000000
   10.000000000000000  -0.000000000000004 -10.000000000000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    78
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

DISPLACEMENT output from Abaqus to Matlab (Record key 101)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\101.inp'],[S(1:a(end)-1),'\101.inp'],'f')
```

Run the input file 101.inp with Abaqus

```
!abaqus job=101
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('101.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('101.fil');
```

Obtain the desired output data

```
out = Rec101(Rec)
```

```
out =

  Columns 1 through 3

   1.000000000000000   2.731019954737037 -18.342486437485469
   2.000000000000000  -4.251769644805327 -20.936960785356849
   3.000000000000000   3.033869793981101  -9.687836993820708
   4.000000000000000  -3.435027553429406 -11.971013840393351
   5.000000000000000   0.000000000000000  -0.000000000000000
   6.000000000000000  -0.000000000000000  -0.000000000000000

  Columns 4 through 5

                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     5
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

```
________________________________________________________
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Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/
```

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VELOCITY output from Abaqus to Matlab (Record key 102)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\102.inp'],[S(1:a(end)-1),'\102.inp'],'f')
```

Run the input file 102.inp with Abaqus

```
!abaqus job=102
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('102.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('102.fil');
```

Obtain the desired output data

```
out = Rec102(Rec)
```

```
out =

  Columns 1 through 3

   1.000000000000000   5.449654331448056 -36.601786995435852
   2.000000000000000  -8.484256887593396 -42.005726737220023
   3.000000000000000   6.053980541277480 -19.331738218961959
   4.000000000000000  -6.854476750607431 -24.114494738199880
   5.000000000000000                   0                   0
   6.000000000000000                   0                   0

  Columns 4 through 5

                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     5
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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ACCELERATION output from Abaqus to Matlab (Record key 103)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\103.inp'],[S(1:a(end)-1),'\103.inp'],'f')
```

Run the input file 103.inp with Abaqus

```
!abaqus job=103
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('103.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('103.fil');
```

Obtain the desired output data

```
out = Rec103(Rec)
```

```
out =

  Columns 1 through 3

   1.000000000000000   9.908462420814647 -66.548703628065184
   2.000000000000000 -15.425921613806169   5.444133205054499
   3.000000000000000  11.007237347777240 -35.148614943567203
   4.000000000000000 -12.462685001104420  37.973645930545672
   5.000000000000000                   0                   0
   6.000000000000000                   0                   0

  Columns 4 through 5

                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     5
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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REACTION FORCE output from Abaqus to Matlab (Record key 104)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\104.inp'],[S(1:a(end)-1),'\104.inp'],'f')
```

Run the input file 104.inp with Abaqus

```
!abaqus job=104
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('104.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('104.fil');
```

Obtain the desired output data

```
out = Rec104(Rec)
```

```
out =

   1.0e+02 *

  Columns 1 through 3

   0.010000000000000                   0                   0
   0.020000000000000                   0                   0
   0.030000000000000                   0                   0
   0.040000000000000                   0                   0
   0.050000000000000  -1.597001903723652   0.796397374756417
   0.060000000000000   1.527272835260465   0.620807230883261

  Columns 4 through 5

                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
                   0                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     5
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =
```

```
double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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ELECTRICAL POTENTIAL output from Abaqus to Matlab (Record key 105)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\105.inp'],[S(1:a(end)-1),'\105.inp'],'f')
```

Run the input file 105.inp with Abaqus

```
!abaqus job=105
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('105.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('105.fil');
```

Obtain the desired output data

```
out = Rec105(Rec)
```

```
out =

   1.0e+06 *

   0.000001000000000  -0.000000000000000
   0.000002000000000  -0.000000000000000
   0.000003000000000  -0.000000000000000
   0.000004000000000  -0.000000000000000
   0.000005000000000   1.000000000000000
   0.000006000000000   1.000000000000001
   0.000007000000000   1.000000000000000
   0.000008000000000   1.000000000000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     8
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr

```
Website: http://users.ntua.gr/gpapazaf/
```

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POINT LOADS, MOMENTS, FLUXES output from Abaqus to Matlab (Record key 106)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\106.inp'],[S(1:a(end)-1),'\106.inp'],'f')
```

Run the input file 106.inp with Abaqus

```
!abaqus job=106
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('106.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('106.fil');
```

Obtain the desired output data

```
out = Rec106(Rec)
```

```
out =

     1     0     0     0     0
     2     0  -100     0     0
     3     0     0     0     0
     4     0  -100     0     0
     5     0     0     0     0
     6     0     0     0     0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     5
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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COORDINATE output from Abaqus to Matlab (Record key 107)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\107.inp'],[S(1:a(end)-1),'\107.inp'],'f')
```

Run the input file 107.inp with Abaqus

```
!abaqus job=107
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('107.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('107.fil');
```

Obtain the desired output data

```
out = Rec107(Rec)
```

```
out =

     1   720   360
     2   720     0
     3   360   360
     4   360     0
     5     0   360
     6     0     0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

COORDINATE output from Abaqus to Matlab (Record key 107)

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PORE OR ACOUSTIC PRESSURE output from Abaqus to Matlab (Record key 108)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\108.inp'],[S(1:a(end)-1),'\108.inp'],'f')
```

Run the input file 108.inp with Abaqus

```
!abaqus job=108
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('108.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('108.fil');
```

Obtain the desired output data

```
out = Rec108(Rec)
```

```
out =

   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000  13.363636363636360
   3.000000000000000  13.363636363636360
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000  12.600000000000000
   7.000000000000000                   0
   9.000000000000000  12.600000000000000
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000  13.363636363636360
   9.000000000000000  13.363636363636360
   1.000000000000000  12.590184459513329
   3.000000000000000                   0
   7.000000000000000  12.602058461213939
   9.000000000000000                   0
   1.000000000000000 -14.999999999999989
   3.000000000000000 -14.999999999999989
   7.000000000000000                   0
   9.000000000000000                   0
   1.000000000000000                   0
   3.000000000000000  -9.000000000000004
   7.000000000000000                   0
   9.000000000000000  -8.999999999999998
   1.000000000000000                   0
   3.000000000000000                   0
   7.000000000000000 -15.000000000000000
   9.000000000000000 -14.999999999999989
   1.000000000000000  -9.000000000000000
```

```
    3.000000000000000                   0
    7.000000000000000  -9.000000000000004
    9.000000000000000                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    60
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

REACTIVE FLUID VOLUME FLUX output from Abaqus to Matlab (Record key 109)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\109.inp'],[S(1:a(end)-1),'\109.inp'],'f')
```

Run the input file 109.inp with Abaqus

```
!abaqus job=109
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('109.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('109.fil');
```

Obtain the desired output data

```
out = Rec109(Rec)
```

```
out =

   1.000000000000000                   0
   2.000000000000000                   0
   3.000000000000000                   0
   4.000000000000000                   0
   5.000000000000000                   0
   6.000000000000000                   0
   7.000000000000000                   0
   8.000000000000000                   0
   1.000000000000000                   0
   2.000000000000000                   0
   3.000000000000000                   0
   4.000000000000000                   0
   5.000000000000000                   0
   6.000000000000000                   0
   7.000000000000000                   0
   8.000000000000000                   0
   1.000000000000000                   0
   2.000000000000000                   0
   3.000000000000000                   0
   4.000000000000000                   0
   5.000000000000000                   0
   6.000000000000000                   0
   7.000000000000000                   0
   8.000000000000000                   0
   1.000000000000000   0.122500000000000
   2.000000000000000  -0.122500000000000
   3.000000000000000  -0.122500000000000
   4.000000000000000   0.122500000000000
   5.000000000000000   0.122500000000000
   6.000000000000000  -0.122500000000000
   7.000000000000000  -0.122500000000000
   8.000000000000000   0.122500000000000
   1.000000000000000                   0
   2.000000000000000                   0
   3.000000000000000                   0
   4.000000000000000                   0
   5.000000000000000                   0
   6.000000000000000                   0
   7.000000000000000                   0
   8.000000000000000                   0
   1.000000000000000                   0
   2.000000000000000                   0
   3.000000000000000                   0
   4.000000000000000                   0
   5.000000000000000                   0
   6.000000000000000                   0
   7.000000000000000                   0
   8.000000000000000                   0
   1.000000000000000                   0
   2.000000000000000                   0
   3.000000000000000                   0
   4.000000000000000                   0
   5.000000000000000                   0
   6.000000000000000                   0
   7.000000000000000                   0
   8.000000000000000                   0
   1.000000000000000                   0
```

2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0
7.000000000000000	0
8.000000000000000	0
1.000000000000000	0
2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0
7.000000000000000	0
8.000000000000000	0
1.000000000000000	0
2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0
7.000000000000000	0
8.000000000000000	0
1.000000000000000	0
2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0
7.000000000000000	0
8.000000000000000	0
1.000000000000000	0
2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0
7.000000000000000	0
8.000000000000000	0
1.000000000000000	0
2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0
7.000000000000000	0
8.000000000000000	0
1.000000000000000	0
2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0
7.000000000000000	0
8.000000000000000	0
1.000000000000000	0
2.000000000000000	0
3.000000000000000	0
4.000000000000000	0
5.000000000000000	0
6.000000000000000	0

```
   7.000000000000000                  0
   8.000000000000000                  0
   1.000000000000000                  0
   2.000000000000000                  0
   3.000000000000000                  0
   4.000000000000000                  0
   5.000000000000000                  0
   6.000000000000000                  0
   7.000000000000000                  0
   8.000000000000000                  0
   1.000000000000000                  0
   2.000000000000000                  0
   3.000000000000000                  0
   4.000000000000000                  0
   5.000000000000000                  0
   6.000000000000000                  0
   7.000000000000000                  0
   8.000000000000000                  0
   1.000000000000000                  0
   2.000000000000000                  0
   3.000000000000000                  0
   4.000000000000000                  0
   5.000000000000000                  0
   6.000000000000000                  0
   7.000000000000000                  0
   8.000000000000000                  0
   1.000000000000000                  0
   2.000000000000000                  0
   3.000000000000000                  0
   4.000000000000000                  0
   5.000000000000000                  0
   6.000000000000000                  0
   7.000000000000000                  0
   8.000000000000000                  0
   1.000000000000000                  0
   2.000000000000000                  0
   3.000000000000000                  0
   4.000000000000000                  0
   5.000000000000000                  0
   6.000000000000000                  0
   7.000000000000000                  0
   8.000000000000000                  0
   1.000000000000000                  0
   2.000000000000000                  0
   3.000000000000000                  0
   4.000000000000000                  0
   5.000000000000000                  0
   6.000000000000000                  0
   7.000000000000000                  0
   8.000000000000000                  0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   168
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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REACTIVE FLUID TOTAL VOLUME output from Abaqus to Matlab (Record key 110)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\110.inp'],[S(1:a(end)-1),'\110.inp'],'f')
```

Run the input file 110.inp with Abaqus

```
!abaqus job=110
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('110.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('110.fil');
```

Obtain the desired output data

```
out = Rec110(Rec)
```

```
out =

     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
```

2	0
3	0
4	0
5	0
6	0
7	0
8	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
1	0
2	0
3	0
4	0
5	0
6	0

```
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   168
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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ELECTRICAL REACTION CHARGE output from Abaqus to Matlab (Record key 119)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\119.inp'],[S(1:a(end)-1),'\119.inp'],'f')
```

Run the input file 119.inp with Abaqus

```
!abaqus job=119
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('119.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('119.fil');
```

Obtain the desired output data

```
out = Rec119(Rec)
```

```
out =

   1.0e+03 *

   0.001000000000000  -1.000000000000001
   0.002000000000000  -1.000000000000001
   0.003000000000000  -1.000000000000001
   0.004000000000000  -1.000000000000000
   0.005000000000000                   0
   0.006000000000000                   0
   0.007000000000000                   0
   0.008000000000000                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     8
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr

```
Website: http://users.ntua.gr/gpapazaf/
```

CONCENTRATED ELECTRICAL NODAL CHARGE output from Abaqus to Matlab (Record key 120)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\120.inp'],[S(1:a(end)-1),'\120.inp'],'f')
```

Run the input file 120.inp with Abaqus

```
!abaqus job=120
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('120.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('120.fil');
```

Obtain the desired output data

```
out = Rec120(Rec)
```

```
out =

     1       -2000
     2       -2000
     3       -2000
     4       -2000
     5       -1000
     6       -1000
     7       -1000
     8       -1000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     8
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

FLUID CAVITY PRESSURE output from Abaqus to Matlab (Record key 136)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\136.inp'],[S(1:a(end)-1),'\136.inp'],'f')
```

Run the input file 136.inp with Abaqus

```
!abaqus job=136
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('136.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('136.fil');
```

Obtain the desired output data

```
out = Rec136(Rec)
```

```
out =

   1.0e+02 *

   0.010000000000000   0.994886121985570
   0.010000000000000   1.796653291058524
   0.010000000000000   2.838728555584885
   0.010000000000000   3.769085573895040
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     4
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

FLUID CAVITY VOLUME output from Abaqus to Matlab (Record key 137)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\137.inp'],[S(1:a(end)-1),'\137.inp'],'f')
```

Run the input file 137.inp with Abaqus

```
!abaqus job=137
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('137.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('137.fil');
```

Obtain the desired output data

```
out = Rec137(Rec)
```

```
out =

   1.000000000000000   0.999942730844457
   1.000000000000000   0.999887194650996
   1.000000000000000   0.999943936752874
   1.000000000000000   0.999990318961477
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     4
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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ELECTRICAL REACTION CURRENT output from Abaqus to Matlab (Record key 138)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\138.inp'],[S(1:a(end)-1),'\138.inp'],'f')
```

Run the input file 138.inp with Abaqus

```
!abaqus job=138
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('138.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('138.fil');
```

Obtain the desired output data

```
out = Rec138(Rec)
```

```
out =

   1.0e+08 *

   9.000000010000001  -0.000658000000000
   9.000000099999999   0.000658000000000
   9.000000010000001  -0.000658000000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     3
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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CONCENTRATED ELECTRICAL NODAL CURRENT output from Abaqus to Matlab (Record key 139)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\139.inp'],[S(1:a(end)-1),'\139.inp'],'f')
```

Run the input file 139.inp with Abaqus

```
!abaqus job=139
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('139.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('139.fil');
```

Obtain the desired output data

```
out = Rec139(Rec)
```

```
out =

   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000009           0
   900000010           0
   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000009           0
   900000010       65800
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    20
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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VISCOUS FORCES DUE TO STATIC STABILIZATION output from Abaqus to Matlab (Record key 145)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\145.inp'],[S(1:a(end)-1),'\145.inp'],'f')
```

Run the input file 145.inp with Abaqus

```
!abaqus job=145
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('145.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('145.fil');
```

Obtain the desired output data

```
out = Rec145(Rec)
```

```
out =

   1.000000000000000  -0.000000000000000                  0
   2.000000000000000  -0.670724475445644                  0
   3.000000000000000  -0.670724475445644  -0.000000000000000
   4.000000000000000  -0.000000000000000  -0.000000000000000
   1.000000000000000   0.000000000000000                  0
   2.000000000000000  -0.582035497070668                  0
   3.000000000000000  -0.582035497070668   0.000000000000018
   4.000000000000000   0.000000000000000   0.000000000000018
   1.000000000000000                   0                  0
   2.000000000000000  -0.521193071769065                  0
   3.000000000000000  -0.521193071769065  -0.000000000000010
   4.000000000000000                   0  -0.000000000000010
   1.000000000000000                   0                  0
   2.000000000000000  -0.466463933092102                  0
   3.000000000000000  -0.466463933092102  -0.000000000000020
   4.000000000000000                   0  -0.000000000000020
   1.000000000000000                   0                  0
   2.000000000000000  -0.431507230339198                  0
   3.000000000000000  -0.431507230339198  -0.000000000000007
   4.000000000000000                   0  -0.000000000000007
   1.000000000000000                   0                  0
   2.000000000000000  -0.399070012003646                  0
   3.000000000000000  -0.399070012003646   0.000000000000026
   4.000000000000000                   0   0.000000000000026
   1.000000000000000                   0                  0
   2.000000000000000  -0.368981416384095                  0
   3.000000000000000  -0.368981416384095   0.000000000000037
   4.000000000000000                   0   0.000000000000037
   1.000000000000000                   0                  0
   2.000000000000000  -0.348345377137403                  0
   3.000000000000000  -0.348345377137403  -0.000000000000045
   4.000000000000000                   0  -0.000000000000045
   1.000000000000000                   0                  0
   2.000000000000000  -0.328821598253689                  0
   3.000000000000000  -0.328821598253689  -0.000000000000019
   4.000000000000000                   0  -0.000000000000019
   1.000000000000000                   0                  0
   2.000000000000000  -0.320070991613232                  0
   3.000000000000000  -0.320070991613232   0.000000000000082
   4.000000000000000                   0   0.000000000000082
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    40
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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TOTAL FORCE output from Abaqus to Matlab (Record key 146)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\146.inp'],[S(1:a(end)-1),'\146.inp'],'f')
```

Run the input file 146.inp with Abaqus

```
!abaqus job=146
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('146.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('146.fil');
```

Obtain the desired output data

```
out = Rec146(Rec)
```

```
out =

   1.0e+10 *

   0.000000000100000   0.000000018955575  -0.655745052083149
   0.000000000200000                   0  -0.655745052083149
   0.000000000300000   0.000000037911150                   0
   0.000000000400000                   0                   0
   0.000000000700000   0.000000018955575   0.655745052083149
   0.000000000800000                   0   0.655745052083149
   0.000000100100000   1.311490104166297                   0
   0.000000000100000   0.000000026034862  -0.758357475100255
   0.000000000200000                   0  -0.758357475100254
   0.000000000300000   0.000000052069724                   0
   0.000000000400000                   0                   0
   0.000000000700000   0.000000026034862   0.758357475100255
   0.000000000800000                   0   0.758357475100254
   0.000000100100000   1.516714950200509                   0
   0.000000000100000   0.000000091469252  -0.908955701181421
   0.000000000200000                   0  -0.908955701181421
   0.000000000300000   0.000000182938504                   0
   0.000000000400000                   0                   0
   0.000000000700000   0.000000091469252   0.908955701181421
   0.000000000800000                   0   0.908955701181421
   0.000000100100000   1.817911402362841                   0
   0.000000000100000   0.000000448294527  -1.127676953993781
   0.000000000200000                   0  -1.127676953993781
   0.000000000300000   0.000000896589055                   0
   0.000000000400000                   0                   0
   0.000000000700000   0.000000448294528   1.127676953993781
   0.000000000800000                   0   1.127676953993782
   0.000000100100000   2.255353907987562                   0
   0.000000000100000   0.000002163264176  -1.440542031672606
   0.000000000200000                   0  -1.440542031672606
   0.000000000300000   0.000004326528353                   0
   0.000000000400000                   0                   0
   0.000000000700000   0.000002163264176   1.440542031672607
   0.000000000800000                   0   1.440542031672607
   0.000000100100000   2.881084063345213                   0
   0.000000000100000   0.000000068938106  -1.518839627864259
   0.000000000200000                   0  -1.518839627864259
   0.000000000300000   0.000000137876212                   0
   0.000000000400000                   0                   0
   0.000000000700000   0.000000068938106   1.518839627864259
   0.000000000800000                   0   1.518839627864259
   0.000000100100000   3.037679255728518                   0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =
```

```
     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    42
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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TEMPERATURE output from Abaqus to Matlab (Record key 201)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\201.inp'],[S(1:a(end)-1),'\201.inp'],'f')
```

Run the input file 201.inp with Abaqus

```
!abaqus job=201
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('201.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('201.fil');
```

Obtain the desired output data

```
out = Rec201(Rec)
```

```
out =

   1.0e+08 *

   9.000000010000001   0.000008311111111
   9.000000020000000   0.000008220850480
   9.000000030000001   0.000007950068587
   9.000000040000000   0.000007498765432
   9.000000050000001   0.000006866941015
   9.000000060000000   0.000006054595336
   9.000000070000001   0.000005061728395
   9.000000080000000   0.000003888340192
   9.000000090000000   0.000002534430727
   9.000000099999999   0.000001000000000
   9.000000010000001                   0
   9.000000020000000                   0
   9.000000030000001   0.000000000000000
   9.000000040000000                   0
   9.000000050000001                   0
   9.000000060000000                   0
   9.000000070000001                   0
   9.000000080000000   0.000000000000000
   9.000000090000000   0.000000000000000
   9.000000099999999   0.000000000000000
   9.000000010000001   0.000008311111111
   9.000000020000000   0.000008220850480
   9.000000030000001   0.000007950068587
   9.000000040000000   0.000007498765432
   9.000000050000001   0.000006866941015
   9.000000060000000   0.000006054595336
   9.000000070000001   0.000005061728395
   9.000000080000000   0.000003888340192
   9.000000090000000   0.000002534430727
   9.000000099999999   0.000001000000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =
```

```
    30
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


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RESIDUAL FLUX output from Abaqus to Matlab (Record key 204)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\204.inp'],[S(1:a(end)-1),'\204.inp'],'f')
```

Run the input file 204.inp with Abaqus

```
!abaqus job=204
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('204.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('204.fil');
```

Obtain the desired output data

```
out = Rec204(Rec)
```

```
out =

   1.0e+08 *

   9.000000099999999  -0.000065800000000
   9.000000020000000  -0.000000000000000
   9.000000030000001   0.000000000000000
   9.000000040000000  -0.000000000000000
   9.000000070000001  -0.000000000000000
   9.000000080000000   0.000000000000000
   9.000000090000000  -0.000000000000000
   9.000000099999999  -0.000000000000000
   9.000000099999999  -0.000065800000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     9
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA

Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

CONCENTRATED FLUX output from Abaqus to Matlab (Record key 206)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\206.inp'],[S(1:a(end)-1),'\206.inp'],'f')
```

Run the input file 206.inp with Abaqus

```
!abaqus job=206
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('206.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('206.fil');
```

Obtain the desired output data

```
out = Rec206(Rec)
```

```
out =

   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000001           0
   900000002           0
   900000003           0
   900000004           0
   900000005           0
   900000006           0
   900000007           0
   900000008           0
   900000001           0
```

900000002	0
900000003	0
900000004	0
900000005	0
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900000001	0
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900000001	0
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900000007	3
900000008	3
900000001	3
900000002	3
900000003	3
900000004	3
900000005	3
900000006	3
900000007	3

```
    900000008           3
    900000001           3
    900000002           3
    900000003           3
    900000004           3
    900000005           3
    900000006           3
    900000007           3
    900000008           3
    900000001           3
    900000002           3
    900000003           3
    900000004           3
    900000005           3
    900000006           3
    900000007           3
    900000008           3
    900000001           3
    900000002           3
    900000003           3
    900000004           3
    900000005           3
    900000006           3
    900000007           3
    900000008           3
    900000001           3
    900000002           3
    900000003           3
    900000004           3
    900000005           3
    900000006           3
    900000007           3
    900000008           3
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   816
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

Published with MATLAB® R2013a

INTERNAL FLUX output from Abaqus to Matlab (Record key 214)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\214.inp'],[S(1:a(end)-1),'\214.inp'],'f')
```

Run the input file 214.inp with Abaqus

```
!abaqus job=214
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('214.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('214.fil');
```

Obtain the desired output data

```
out = Rec214(Rec)
```

```
out =

   1.0e+08 *

   9.000000010000001  -0.000000196721311
   9.000000020000000  -0.000000196721311
   9.000000030000001  -0.000000196721311
   9.000000040000000  -0.000000196721311
   9.000000050000001  -0.000000196721311
   9.000000060000000  -0.000000196721311
   9.000000070000001  -0.000000196721311
   9.000000080000000  -0.000000196721311
   9.000000010000001  -0.000000193496372
   9.000000020000000  -0.000000193496372
   9.000000030000001  -0.000000193496372
   9.000000040000000  -0.000000193496372
   9.000000050000001  -0.000000193496372
   9.000000060000000  -0.000000193496372
   9.000000070000001  -0.000000193496372
   9.000000080000000  -0.000000193496372
   9.000000010000001  -0.000000190324300
   9.000000020000000  -0.000000190324300
   9.000000030000001  -0.000000190324300
   9.000000040000000  -0.000000190324300
   9.000000050000001  -0.000000190324300
   9.000000060000000  -0.000000190324300
   9.000000070000001  -0.000000190324300
   9.000000080000000  -0.000000190324300
   9.000000010000001  -0.000000187204230
   9.000000020000000  -0.000000187204230
   9.000000030000001  -0.000000187204230
   9.000000040000000  -0.000000187204230
   9.000000050000001  -0.000000187204230
   9.000000060000000  -0.000000187204230
   9.000000070000001  -0.000000187204230
   9.000000080000000  -0.000000187204230
   9.000000010000001  -0.000000184135308
   9.000000020000000  -0.000000184135308
   9.000000030000001  -0.000000184135308
   9.000000040000000  -0.000000184135308
   9.000000050000001  -0.000000184135308
   9.000000060000000  -0.000000184135308
   9.000000070000001  -0.000000184135308
   9.000000080000000  -0.000000184135308
   9.000000010000001  -0.000000181116696
   9.000000020000000  -0.000000181116696
   9.000000030000001  -0.000000181116696
   9.000000040000000  -0.000000181116696
   9.000000050000001  -0.000000181116696
   9.000000060000000  -0.000000181116696
   9.000000070000001  -0.000000181116696
   9.000000080000000  -0.000000181116696
   9.000000010000001  -0.000000178147570
   9.000000020000000  -0.000000178147570
   9.000000030000001  -0.000000178147570
   9.000000040000000  -0.000000178147570
   9.000000050000001  -0.000000178147570
   9.000000060000000  -0.000000178147570
   9.000000070000001  -0.000000178147570
```

```
9.000000080000000  -0.000000178147570
9.000000010000001  -0.000000175227118
9.000000020000000  -0.000000175227118
9.000000030000001  -0.000000175227118
9.000000040000000  -0.000000175227118
9.000000050000001  -0.000000175227118
9.000000060000000  -0.000000175227118
9.000000070000001  -0.000000175227118
9.000000080000000  -0.000000175227118
9.000000010000001  -0.000000172354543
9.000000020000000  -0.000000172354543
9.000000030000001  -0.000000172354543
9.000000040000000  -0.000000172354543
9.000000050000001  -0.000000172354543
9.000000060000000  -0.000000172354543
9.000000070000001  -0.000000172354543
9.000000080000000  -0.000000172354543
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9.000000020000000  -0.000000169529058
9.000000030000001  -0.000000169529058
9.000000040000000  -0.000000169529058
9.000000050000001  -0.000000169529058
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9.000000070000001  -0.000000169529058
9.000000080000000  -0.000000169529058
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9.000000020000000  -0.000000166749893
9.000000030000001  -0.000000166749893
9.000000040000000  -0.000000166749893
9.000000050000001  -0.000000166749893
9.000000060000000  -0.000000166749893
9.000000070000001  -0.000000166749893
9.000000080000000  -0.000000166749893
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9.000000020000000  -0.000000164016289
9.000000030000001  -0.000000164016289
9.000000040000000  -0.000000164016289
9.000000050000001  -0.000000164016289
9.000000060000000  -0.000000164016289
9.000000070000001  -0.000000164016289
9.000000080000000  -0.000000164016289
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9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
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9.000000070000001	0.000000030000000
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9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
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9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000

9.000000050000001	0.000000030000000
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9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
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9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
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9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
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9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000

9.000000020000000	0.000000030000000
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9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000
9.000000060000000	0.000000030000000
9.000000070000001	0.000000030000000
9.000000080000000	0.000000030000000
9.000000010000001	0.000000030000000
9.000000020000000	0.000000030000000
9.000000030000001	0.000000030000000
9.000000040000000	0.000000030000000
9.000000050000001	0.000000030000000

```
   9.000000060000000   0.000000030000000
   9.000000070000001   0.000000030000000
   9.000000080000000   0.000000030000000
   9.000000010000001   0.000000030000000
   9.000000020000000   0.000000030000000
   9.000000030000001   0.000000030000000
   9.000000040000000   0.000000030000000
   9.000000050000001   0.000000030000000
   9.000000060000000   0.000000030000000
   9.000000070000001   0.000000030000000
   9.000000080000000   0.000000030000000
   9.000000010000001   0.000000030000000
   9.000000020000000   0.000000030000000
   9.000000030000001   0.000000030000000
   9.000000040000000   0.000000030000000
   9.000000050000001   0.000000030000000
   9.000000060000000   0.000000030000000
   9.000000070000001   0.000000030000000
   9.000000080000000   0.000000030000000
   9.000000010000001   0.000000030000000
   9.000000020000000   0.000000030000000
   9.000000030000001   0.000000030000000
   9.000000040000000   0.000000030000000
   9.000000050000001   0.000000030000000
   9.000000060000000   0.000000030000000
   9.000000070000001   0.000000030000000
   9.000000080000000   0.000000030000000
   9.000000010000001   0.000000030000000
   9.000000020000000   0.000000030000000
   9.000000030000001   0.000000030000000
   9.000000040000000   0.000000030000000
   9.000000050000001   0.000000030000000
   9.000000060000000   0.000000030000000
   9.000000070000001   0.000000030000000
   9.000000080000000   0.000000030000000
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =
```

```
    816
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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NORMALIZED CONCENTRATION (MASS DIFFUSION ANALYSIS) output from Abaqus to Matlab (Record key 221)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\221.inp'],[S(1:a(end)-1),'\221.inp'],'f')
```

Run the input file 221.inp with Abaqus

```
!abaqus job=221
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('221.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('221.fil');
```

Obtain the desired output data

```
out = Rec221(Rec)
```

```
out =

   1.0e+04 *

   0.000100000000000                   0
   0.000200000000000                   0
   0.000300000000000   4.874005305039780
   0.000400000000000   1.624668435013260
   0.000100000000000   2.785145888594160
   0.000200000000000   2.785145888594160
   0.000300000000000   0.000000000000001
   0.000400000000000   0.000000000000000
   0.000100000000000                   0
   0.000200000000000   5.570291777188320
   0.000300000000000   5.570291777188321
   0.000400000000000                   0
   0.000100000000000                   0
   0.000200000000000                   0
   0.000300000000000   2.785145888594159
   0.000400000000000   2.785145888594159
   0.000100000000000   5.570291777188320
   0.000200000000000                   0
   0.000300000000000                   0
   0.000400000000000   5.570291777188319
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     2
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    20
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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MOTIONS (IN CAVITY RADIATION ANALYSIS) output from Abaqus to Matlab (Record key 237)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\237.inp'],[S(1:a(end)-1),'\237.inp'],'f')
```

Run the input file 237.inp with Abaqus

```
!abaqus job=237
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('237.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('237.fil');
```

Obtain the desired output data

```
out = Rec237(Rec)
```

```
out =

     1     0     0
     2     0     0
     3     0     0
     4     0     0
     5     0     0
     6     0     0
     7     0     0
     8     0     0
     9     0     0
    10     0     0
    11     0     0
    12     0     0
    13     0     0
    14     0     0
    15     0     0
    16     0     0
    17     0     0
    18     0     0
    21     0     0
    22     0     0
    23     0     0
    24     0     0
    25     0     0
    26     0     0
    27     0     0
    28     0     0
    29     0     0
    30     0     0
    31     0     0
    32     0     0
    33     0     0
    34     0     0
    35     0     0
    36     0     0
    37     0     0
    38     0     0
    41     0     0
    42     0     0
    43     0     0
    44     0     0
    45     0     0
    46     0     0
    47     0     0
    48     0     0
    49     0     0
    50     0     0
    51     0     0
    52     0     0
    53     0     0
    54     0     0
    55     0     0
    56     0     0
    57     0     0
    58     0     0
    61     0     0
    62     0     0
```

63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
101	0	0
102	0	0
103	0	0
104	0	0
105	0	0
106	0	0
107	0	0
108	0	0
109	0	0
110	0	0
111	0	0
112	0	0
113	0	0
114	0	0
115	0	0
116	0	0
117	0	0
118	0	0
121	0	0
122	0	0
123	0	0
124	0	0
125	0	0
126	0	0
127	0	0
128	0	0
129	0	0

130	0	0
131	0	0
132	0	0
133	0	0
134	0	0
135	0	0
136	0	0
137	0	0
138	0	0
141	0	0
142	0	0
143	0	0
144	0	0
145	0	0
146	0	0
147	0	0
148	0	0
149	0	0
150	0	0
151	0	0
152	0	0
153	0	0
154	0	0
155	0	0
156	0	0
157	0	0
158	0	0
161	0	0
162	0	0
163	0	0
164	0	0
165	0	0
166	0	0
167	0	0
168	0	0
169	0	0
170	0	0
171	0	0
172	0	0
173	0	0
174	0	0
175	0	0
176	0	0
177	0	0
178	0	0
181	0	0
182	0	0
183	0	0
184	0	0
185	0	0
186	0	0
187	0	0
188	0	0
189	0	0
190	0	0
191	0	0
192	0	0
193	0	0
194	0	0
195	0	0

196	0	0
197	0	0
198	0	0
201	0	0
202	0	0
203	0	0
204	0	0
205	0	0
206	0	0
207	0	0
208	0	0
209	0	0
210	0	0
211	0	0
212	0	0
213	0	0
214	0	0
215	0	0
216	0	0
217	0	0
218	0	0
221	0	0
222	0	0
223	0	0
224	0	0
225	0	0
226	0	0
227	0	0
228	0	0
229	0	0
230	0	0
231	0	0
232	0	0
233	0	0
234	0	0
235	0	0
236	0	0
237	0	0
238	0	0
241	0	0
242	0	0
243	0	0
244	0	0
245	0	0
246	0	0
247	0	0
248	0	0
249	0	0
250	0	0
251	0	0
252	0	0
253	0	0
254	0	0
255	0	0
256	0	0
257	0	0
258	0	0
261	0	0
262	0	0
263	0	0
264	0	0

265	0	0
266	0	0
267	0	0
268	0	0
269	0	0
270	0	0
271	0	0
272	0	0
273	0	0
274	0	0
275	0	0
276	0	0
277	0	0
278	0	0
281	0	0
282	0	0
283	0	0
284	0	0
285	0	0
286	0	0
287	0	0
288	0	0
289	0	0
290	0	0
291	0	0
292	0	0
293	0	0
294	0	0
295	0	0
296	0	0
297	0	0
298	0	0
301	0	0
302	0	0
303	0	0
304	0	0
305	0	0
306	0	0
307	0	0
308	0	0
309	0	0
310	0	0
311	0	0
312	0	0
313	0	0
314	0	0
315	0	0
316	0	0
317	0	0
318	0	0
321	0	0
322	0	0
323	0	0
324	0	0
325	0	0
326	0	0
327	0	0
328	0	0
329	0	0
330	0	0

331	0	0
332	0	0
333	0	0
334	0	0
335	0	0
336	0	0
337	0	0
338	0	0
341	0	0
342	0	0
343	0	0
344	0	0
345	0	0
346	0	0
347	0	0
348	0	0
349	0	0
350	0	0
351	0	0
352	0	0
353	0	0
354	0	0
355	0	0
356	0	0
357	0	0
358	0	0
361	0	0
362	0	0
363	0	0
364	0	0
365	0	0
366	0	0
367	0	0
368	0	0
369	0	0
370	0	0
371	0	0
372	0	0
373	0	0
374	0	0
375	0	0
376	0	0
377	0	0
378	0	0
381	0	0
382	0	0
383	0	0
384	0	0
385	0	0
386	0	0
387	0	0
388	0	0
389	0	0
390	0	0
391	0	0
392	0	0
393	0	0
394	0	0
395	0	0
396	0	0
397	0	0

```
    398     0     0
    401     0     0
    402     0     0
    403     0     0
    404     0     0
    405     0     0
    406     0     0
    407     0     0
    408     0     0
    409     0     0
    410     0     0
    411     0     0
    412     0     0
    413     0     0
    414     0     0
    415     0     0
    416     0     0
    417     0     0
    418     0     0
    421     0     0
    422     0     0
    423     0     0
    424     0     0
    425     0     0
    426     0     0
    427     0     0
    428     0     0
    429     0     0
    430     0     0
    431     0     0
    432     0     0
    433     0     0
    434     0     0
    435     0     0
    436     0     0
    437     0     0
    438     0     0
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     3
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

   396
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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ELEMENT DEFINITION output from Abaqus to Matlab (Record key 1900)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\1900.inp'],[S(1:a(end)-1),'\1900.inp'],'f')
```

Run the input file 1900.inp with Abaqus

```
!abaqus job=1900
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('1900.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('1900.fil');
```

Obtain the desired output data

```
out = Rec1900(Rec)
```

```
out =

    [ 1]    'FRAME2D'    [5]    [3]
    [ 2]    'FRAME2D'    [3]    [1]
    [ 3]    'FRAME2D'    [6]    [4]
    [ 4]    'FRAME2D'    [4]    [2]
    [ 5]    'FRAME2D'    [3]    [4]
    [ 6]    'FRAME2D'    [1]    [2]
    [ 7]    'FRAME2D'    [5]    [4]
    [ 8]    'FRAME2D'    [6]    [3]
    [ 9]    'FRAME2D'    [3]    [2]
    [10]    'FRAME2D'    [4]    [1]
    [11]    'MASS'       [1]    [0]
    [12]    'MASS'       [2]    [0]
    [13]    'MASS'       [3]    [0]
    [14]    'MASS'       [4]    [0]
    [15]    'MASS'       [5]    [0]
    [16]    'MASS'       [6]    [0]
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     4
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    16
```

Check class of output

```
cOut=class(out)
```

```
cOut =

cell
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

NODE DEFINITION output from Abaqus to Matlab (Record key 1901)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\1901.inp'],[S(1:a(end)-1),'\1901.inp'],'f')
```

Run the input file 1901.inp with Abaqus

```
!abaqus job=1901
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('1901.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('1901.fil');
```

Obtain the desired output data

```
out = Rec1901(Rec)
```

```
out =

   1.0e+02 *

  Columns 1 through 3

   0.010000000000000   7.200000000000000   3.600000000000000
   0.020000000000000   7.200000000000000                   0
   0.030000000000000   3.600000000000000   3.600000000000000
   0.040000000000000   3.600000000000000                   0
   0.050000000000000                   0   3.600000000000000
   0.060000000000000                   0                   0

  Columns 4 through 5

                   0  -0.007071067811865
                   0   0.007071067811865
                   0   0.007071067811865
                   0  -0.007071067811865
                   0   0.007071067811865
                   0  -0.007071067811865
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

     5
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

     6
```

Check class of output

```
cOut=class(out)
```

```
cOut =
```

```
double
```


Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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MODAL output from Abaqus to Matlab (Record key 1980)

In this example a simple Abaqus model is analysed and results are retrieved by postprocessing the results *.fil file generated by Abaqus using Matlab. For more information please see the Documentation of Abaqus2Matlab toolbox.

Contents

Run Abaqus model

Change current directory to Abaqus working directory

```
a = strfind(S,'\');
cd(S(1:a(end)-1))
```

Copy the input file to be run by Abaqus into the Abaqus working directory

```
copyfile([S,'\AbaqusInputFiles\1980.inp'],[S(1:a(end)-1),'\1980.inp'],'f')
```

Run the input file 1980.inp with Abaqus

```
!abaqus job=1980
```

Pause Matlab execution to give Abaqus enough time to create the lck file

```
pause(10)
```

If the lck file exists then halt Matlab execution

```
while exist('1980.lck','file')==2
  pause(0.1)
end
```

Postprocess Abaqus results file with Matlab

Assign all lines of the fil file in an one-row string (after Abaqus analysis terminates)

```
Rec = Fil2str('1980.fil');
```

Obtain the desired output data

```
out = Rec1980(Rec)
```

```
out =

   1.0e+06 *

  Columns 1 through 3

   0.000001000000000                   0   0.000002759043609
   0.000002000000000                   0   0.000002479694534
   0.000003000000000   0.000000000000000   0.000002131232517
   0.000004000000000   0.000000000000000   0.000001376338419
   0.000005000000000   0.000000000000000   0.000001487922843
   0.000006000000000   0.000000000000000   0.000001711232302
   0.000007000000000   0.000001416397939   0.000002530684255
   0.000008000000000   0.000013151093433   0.000002766384232
   0.000009000000000   0.000014646234081   0.000003101353588
   0.000010000000000   0.000043251206716   0.000003891928495

  Columns 4 through 6

                   0   0.000000000000000   0.000000000000000
                   0  -0.000000000000000  -0.000000000000000
                   0   0.000000000000000  -0.000000000000000
                   0  -0.000000000000000  -0.000000000000000
                   0   0.000000000000000   0.000000000000000
                   0  -0.000000000000000  -0.000000000000000
                   0   0.000000000000000   0.000001105052207
                   0   0.000001155672518   0.000000000000000
                   0   0.000000000000000   0.000000532285136
                   0  -0.000000000000000  -0.000000033616920

  Columns 7 through 9

  -0.000000014027347  -0.000248357375262   0.000012901200166
   0.000000065024434   0.000100905678922  -0.000085113139961
   0.000001339884146   0.000247482024720  -0.000361716135031
   0.000001249903542   0.000197186441009  -0.000680052913959
  -0.000000026388587   0.000032504265299  -0.000372757276793
   0.000000082191355   0.000067298740090   0.000301415849656
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0

  Columns 10 through 12

   0.000000000000000   0.000000000000000   0.000000000000000
  -0.000000000000003   0.000000000000000   0.000000000000000
  -0.000000000000003   0.000000000000000   0.000000000000000
  -0.000000000000000   0.000000000000000   0.000000000000000
   0.000000000000003   0.000000000000000   0.000000000000000
  -0.000000000000004   0.000000000000000   0.000000000000000
   0.000747409244904   0.000000000000000   0.000003090320734
  -0.000208021053185   0.000003694724597   0.000000000000000
   0.000044968031440   0.000000000000000   0.000000878698654
  -0.000028481189428   0.000000000000000   0.000000004398258

  Columns 13 through 15

   0.000000000542887   0.170181633418716   0.000459217882742
```

```
   0.000000010484587   0.025248140736398   0.017963518683581
   0.000003826179411   0.130532349357449   0.278847398544362
   0.000002150196897   0.053515468281103   0.636517934245476
   0.000000001036126   0.001572031048744   0.206743884501058
   0.000000011560091   0.007750377157180   0.155468046144639
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0
                   0                   0                   0

  Column 16

   0.000000000000000
   0.000000000000000
   0.000000000000000
   0.000000000000000
   0.000000000000000
   0.000000000000000
   1.413692304991781
   0.119709076958187
   0.006271321061851
   0.003157047360961
```

Verify output

Check number of attributes

```
nAttr=size(out,2)
```

```
nAttr =

    16
```

Check the number of entries

```
nEntr=size(out,1)
```

```
nEntr =

    10
```

Check class of output

```
cOut=class(out)
```

```
cOut =

double
```

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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Table of records written for any element file output request

Find the record key, the output variable identifier and the function associated with each of the possible element result types, sorted in alphabetical order. The following 32 different element result types can be used with Abaqus2Matlab toolbox.

ELEMENT RECORD TYPE	RECORD KEY	OUTPUT VARIABLE IDENTIFIER	FUNCTION
Coordinates	8	COORD	Rec8.m
Average Shell Section Stress	83	SSAVG	Rec83.m
Concrete Failure	31	CONF	Rec31.m
Creep Strain (Including Swelling)	23	CE	Rec23.m
Element Status	61	STATUS	Rec61.m
Energy (Summed over Element)	19	ELEN	Rec19.m
Energy Density	14	ENER	Rec14.m
Film	33	FILM	Rec33.m
Gel (Pore Pressure Analysis)	40	GELVR	Rec40.m
Heat Flux Vector	28	HFL	Rec28.m
Logarithmic Strain	89	LE	Rec89.m
Mass Concentration (Mass Diffusion Analysis)	38	CONC	Rec38.m
Mechanical Strain Rate	91	ER	Rec91.m
Nodal Flux Caused by Heat	10	NFLUX	Rec10.m
Nominal Strain	90	NE	Rec90.m
Plastic Strain	22	PE	Rec22.m
Pore Fluid Effective Velocity Vector	97	FLVEL	Rec97.m
Pore or Acoustic Pressure	18	POR	Rec18.m
Radiation	34	RAD	Rec34.m
Saturation (Pore Pressure Analysis)	35	SAT	Rec35.m
Section Force and Moment	13	SF	Rec13.m
Section Strain and Curvature	29	SE	Rec29.m
Section Thickness	27	STH	Rec27.m
Strain Jump at Nodes	32	SJP	Rec32.m
Stress	11	S	Rec11.m
Stress Invariant	12	SINV	Rec12.m

Thermal Strain	88	THE	Rec88.m
Total Elastic Strain	25	EE	Rec25.m
Total Fluid Volume Ratio	43	FLUVR	Rec43.m
Total Inelastic Strain	24	IE	Rec24.m
Total Strain	21	E	Rec21.m
Unit Normal to Crack in Concrete	26	CRACK	Rec26.m

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Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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Table of records written for any node file output request

Find the record key, the output variable identifier and the function associated with each of the possible nodal result types, sorted in alphabetical order. The following 24 different nodal result types can be used with Abaqus2Matlab toolbox.

NODAL RECORD TYPE	RECORD KEY	OUTPUT VARIABLE IDENTIFIER	FUNCTION
Concentrated Electrical Nodal Charge	120	CECHG	Rec120.m
Concentrated Electrical Nodal Current	139	CECUR	Rec139.m
Concentrated Flux	206	CFL	Rec206.m
Electrical Potential	105	EPOT	Rec105.m
Electrical Reaction Charge	119	RCHG	Rec119.m
Electrical Reaction Current	138	RECUR	Rec138.m
Fluid Cavity Pressure	136	PCAV	Rec136.m
Fluid Cavity Volume	137	CVOL	Rec137.m
Internal Flux	214	RFLE	Rec214.m
Motions (in Cavity Radiation Analysis)	237	MOT	Rec237.m
Nodal Acceleration	103	A	Rec103.m
Nodal Coordinate	107	COORD	Rec107.m
Nodal Displacement	101	U	Rec101.m
Nodal Point Load	106	CF	Rec106.m
Nodal Reaction Force	104	RF	Rec104.m
Nodal Velocity	102	V	Rec102.m
Normalized Concentration (Mass Diffusion Analysis)	221	NNC	Rec221.m
Pore or Acoustic Pressure	108	POR	Rec108.m
Reactive Fluid Total Volume	110	RVT	Rec110.m
Reactive Fluid Volume Flux	109	RVF	Rec109.m
Residual Flux	204	RFL	Rec204.m
Temperature	201	NT	Rec201.m
Total Force	146	TF	Rec146.m
Viscous Forces Due to Static Stabilization	145	VF	Rec145.m

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA

```
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/
```

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Table of records written for any file output request

Find the record key, the output variable identifier and the function associated with each of the possible analysis result types, sorted in alphabetical order. The following 3 different analysis result types can be used with Abaqus2Matlab toolbox.

RECORD TYPE	RECORD KEY	OUTPUT VARIABLE IDENTIFIER	FUNCTION
Element definitions	1900	-	Rec1900.m
Modal	1980	-	Rec1980.m
Node definitions	1901	-	Rec1901.m

Captain, Infrastructure Engineer, Hellenic Air Force
Civil Engineer, M.Sc., Ph.D. candidate, NTUA
Email: gpapazafeiropoulos@yahoo.gr
Website: http://users.ntua.gr/gpapazaf/

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