Topic:

Mapping loads from CFD results in Tecplot format

Topic details:

This pdf is intended to demonstrate how (typically scalar) loads from CFD results in Tecplot format can be transferred to a model belonging to any solver that is supported by HyperMesh such as Optistruct, Abaqus etc.

A typical TECPLOT results file contains several simulation results (e.g. Pressure, Temperature, Velocity magnitude, etc), one file will be created for each solution component, and each file name contains a sub-string identifying the solution component.

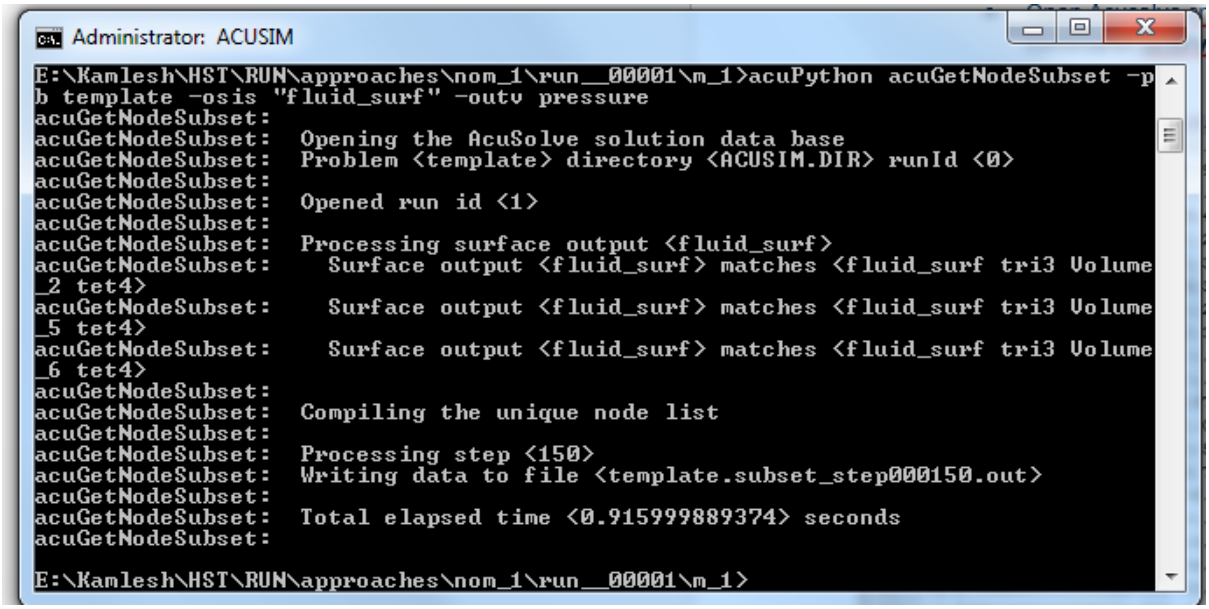
Step-1 create variables nodes.

- Create variables nodes (pressure, temperature, velocity magnitude, etc.) from CFD solution Date using Acusolve command prompt.
- CFD solution date should be have Acusim.dir & log file in working directory.
- Place the Python script file (acuGetNodeSubset) in your working directory.

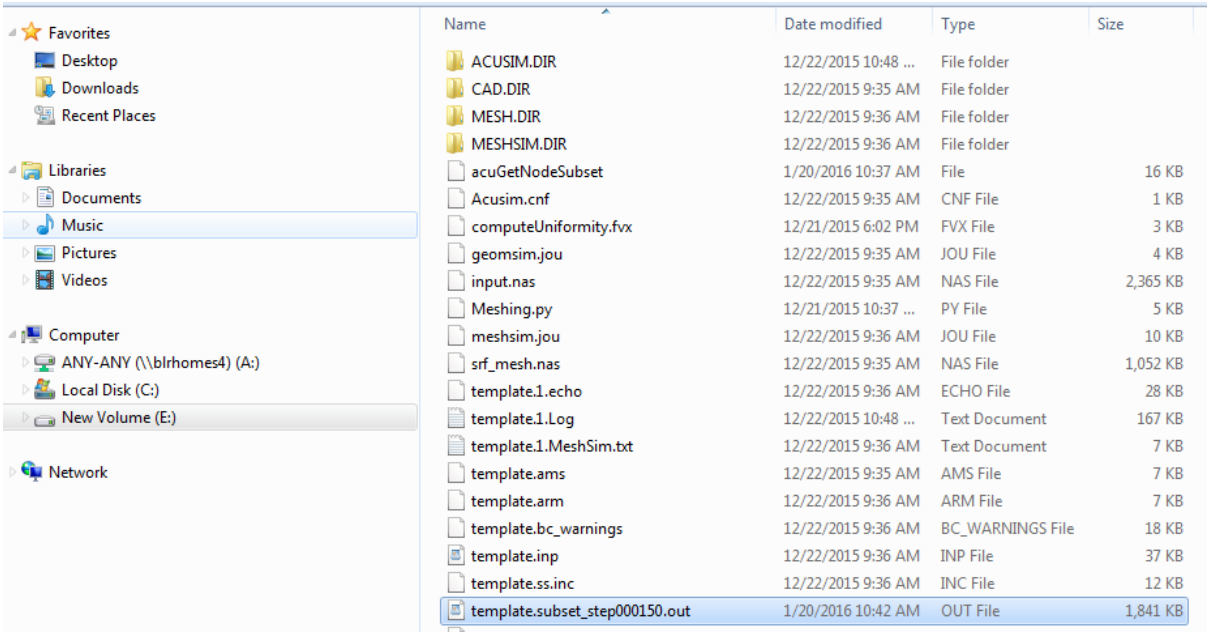
- Open Acusolve cmd prompt. Read your working directory. And use the command (**acuPython acuGetNodeSubset –h will give you more options)**
- Write the following command at the prompt
  acuPython acuGetNodeSubset –pb <problem name as per input file> -osis “surface name “ –outv pressure.
  For this example, the command will look like this
  acuPython acuGetNodeSubset –pb templet -osis “fluid_surf “ –outv pressure

- For help, enter the command:

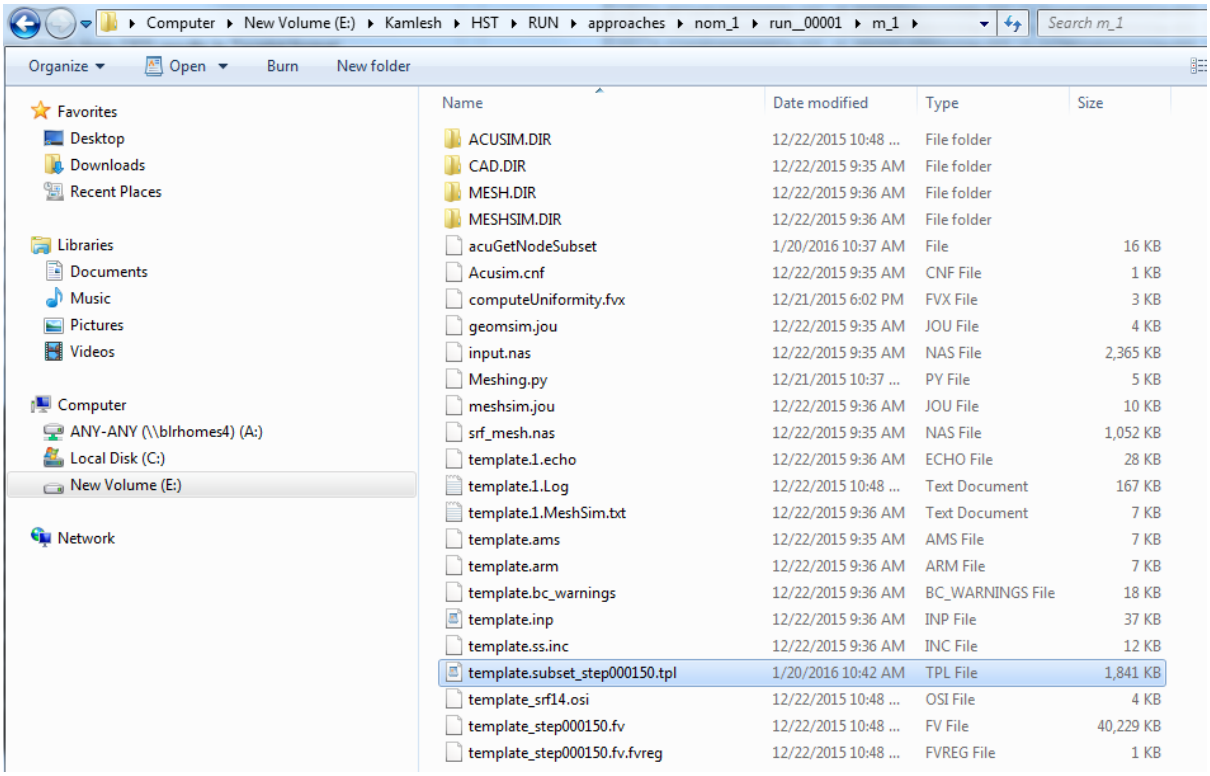
acuPython acuGetNodeSubset –h



- Templet .subset_step000010.out file will write in specified folder



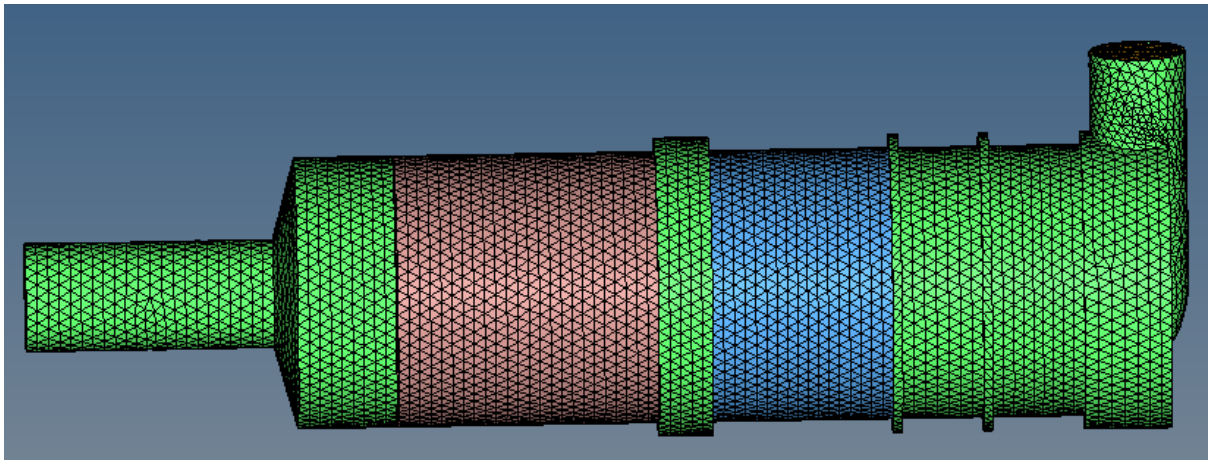
- change file extension from .out to .tpl



```
-2.7920247599999998e-001 -3.4377167999999998e-003 -4.6650146300000001e-001 7.6672523572891685e-002
-2.1255205299999999e-001 -1.2474624300000001e-001 -7.5748091100000003e-001 7.4339395590612242e-002
-2.7802358500000002e-001 1.9189501899999999e-002 -1.0174812600000001e+000 7.1874768536402636e-002
-2.3974337300000000e-004 -7.6514810899999994e-002 -8.1748775399999996e-001 7.4384361709006308e-002
-2.7895707400000003e-001 9.4388380799999994e-003 -1.1174736800000000e+000 7.1707665751487792e-002
-2.1582286600000000e-001 1.2178000500000000e-001 -1.0274904899999999e+000 7.1856854884787422e-002
-3.2197218999999999e-002 1.3343100999999999e-001 -1.0274737899999999e+000 7.1691830927060884e-002
2.3071231099999999e-002 -6.3408905099999996e-002 -1.0174979900000001e+000 7.2050871411857537e-002
-2.3661208700000000e-001 1.2529756700000000e-001 -8.1747912400000000e-001 7.4262544744600562e-002
3.5724385499999997e-002 -2.3984301100000000e-003 -1.1174935600000000e+000 7.1789522676272463e-002
-8.1732508699999998e-002 -1.5801182599999999e-001 -1.1274793100000000e+000 7.2012422109936899e-002
-1.4363105400000001e-001 -1.4930893100000001e-001 -1.1274908299999999e+000 7.2047935539509722e-002
5.0618568700000000e-003 6.6769453500000006e-002 -1.2300758500000000e+000 7.1420554266807004e-002
-4.8097784399999999e-004 1.0316002000000001e-001 -1.2300881299999999e+000 7.0952406266434245e-002
-1.0251829899999999e-001 2.5715108700000000e-001 -1.3407988300000000e+000 1.1878371184969871e-003
-2.8382635899999997e-001 5.7732556999999997e-002 -7.5749148200000005e-001 7.4297468002228848e-002
-9.1855325900000007e-002 -4.6903223799999998e-002 -5.7510506699999998e-002 9.2557953836965356e-002
-2.7825094800000000e-001 -1.7254409299999999e-002 -4.6649592299999998e-001 7.6803646200135994e-002
-2.7603335899999998e-001 -3.0924879299999999e-002 -4.6648800400000001e-001 7.6853696302239233e-002
-2.7254386500000000e-001 -4.4330971099999998e-002 -4.6650016599999999e-001 7.6743471722669904e-002
-2.6784622600000002e-001 -5.7361847899999999e-002 -4.6649742100000002e-001 7.6562065232158749e-002
-2.6195747800000002e-001 -6.9902454200000005e-002 -4.6650286600000002e-001 7.6325585826391859e-002
-2.5493819299999998e-001 -8.1847286800000002e-002 -4.6650635000000001e-001 7.6103966980716559e-002
-2.4685087200000000e-001 -9.3098963199999996e-002 -4.6650422600000002e-001 7.5984738811645566e-002
-2.3776548700000000e-001 -1.0355980100000001e-001 -4.6649404900000002e-001 7.5966468784344793e-002
-2.2774440100000001e-001 -1.1312883300000000e-001 -4.6649783600000000e-001 7.6021332782234191e-002
-2.1687916600000001e-001 -1.2172851400000000e-001 -4.6650567399999998e-001 7.6126175008616681e-002
-2.0527113299999999e-001 -1.2929694000000000e-001 -4.6650367300000001e-001 7.6335776124058632e-002
-1.9301538100000001e-001 -1.3575951000000000e-001 -4.6650301700000002e-001 7.6531701444820188e-002
-1.8021402400000000e-001 -1.4106179999999999e-001 -4.6650529000000002e-001 7.6686679473520813e-002
```

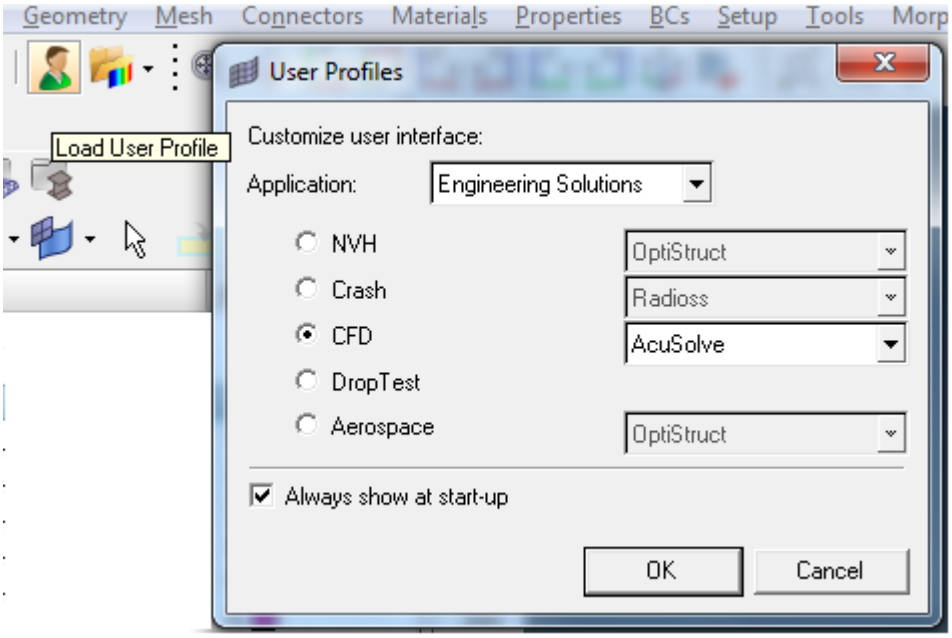
Steps involved in the process:

The objective is to extract loads (say,*pressure*) from the Tecplot file (*templet.subset_steep000150..tpl,* shown in fig.1) generated by CFD (Acusolve) associated with the CFD model (*input..hm* shown in fig) in a format compatible with HyperMesh's Linear Interpolation reader and apply these loads on the model.



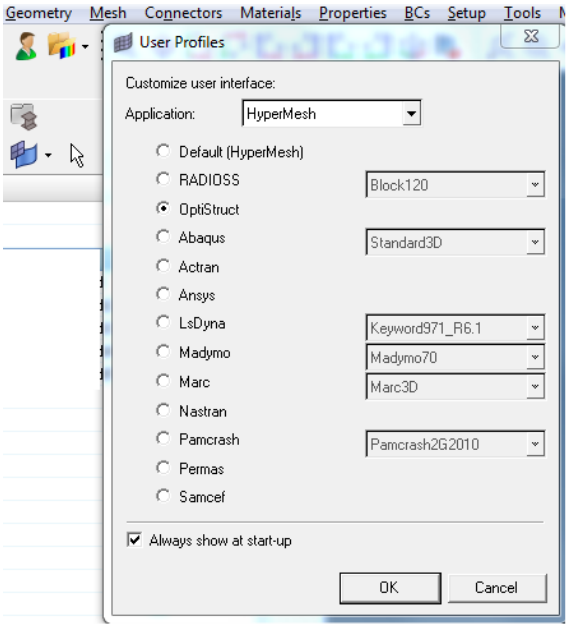
Step 1: Retrieve the model file

- Go to ***Preferences*** dropdown > ***User Profiles… >*** **Engineering solution>**select ***CFD .Acusolve*** and say ***OK***



- From the ***File*** menu, select ***Open…*** or click the ***Open .hm File*** icon , to load the model file (*input.hm* in this case).

- Go to ***Preferences*** dropdown > ***User Profiles… >*** **Hyper mesh>**select ***optistruct >*** and say **OK**



Step 2: Applying loads on the model (*"pressure"* ***in this case)***

a. Go to ***Analysis*** page > ***pressures*** panel > ***create*** sub-panel.

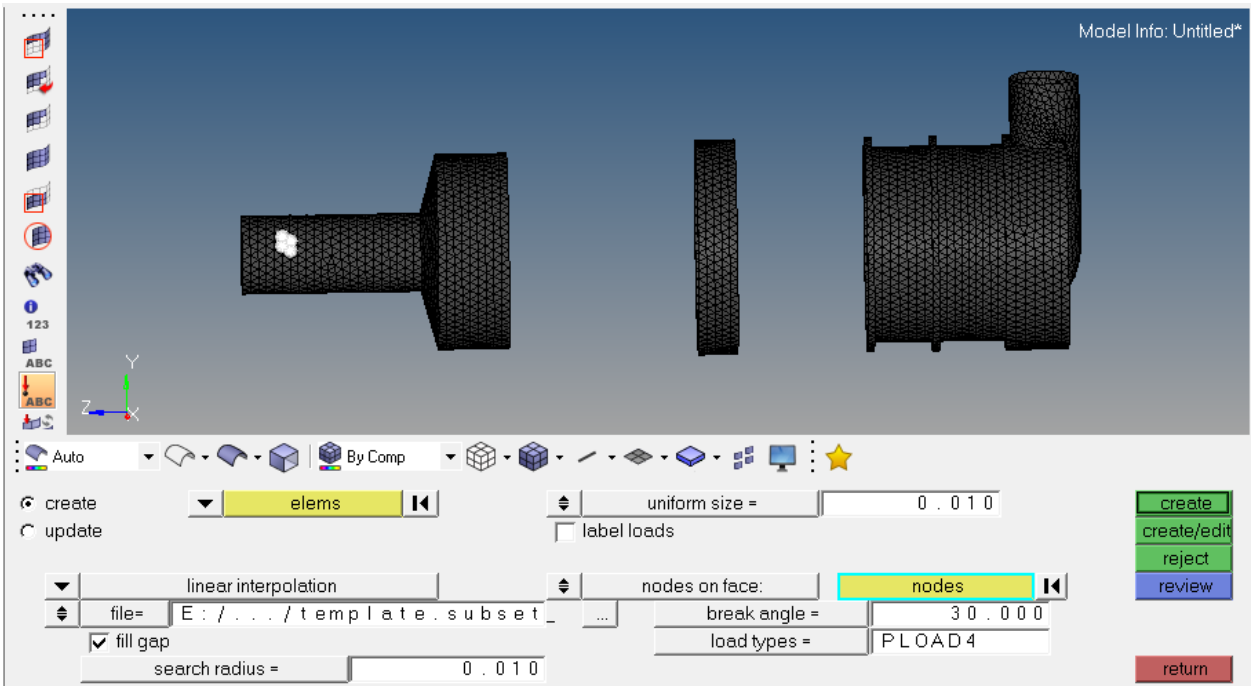
b. Select ***linear interpolation*** option to apply the magnitude and browse the appropriate solution component file (in this case, *templet.subset_steep000150..tpl*).

c. Switch entity to ***elems*** and select the elements on which the pressure loading needs to be applied.

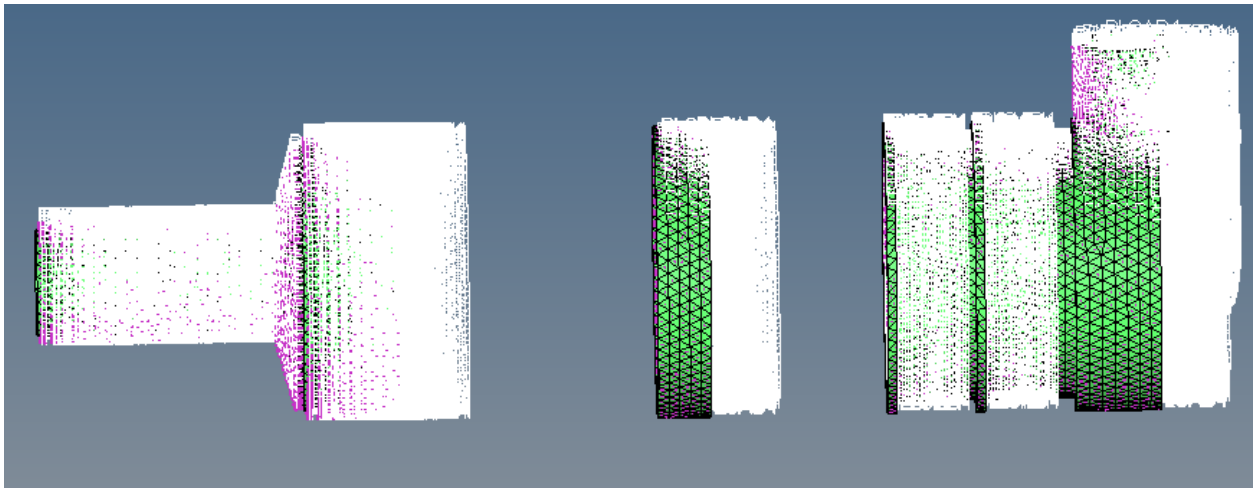
d. Also, give appropriate inputs for ***nodes on face, search radius*** etc.

Note:

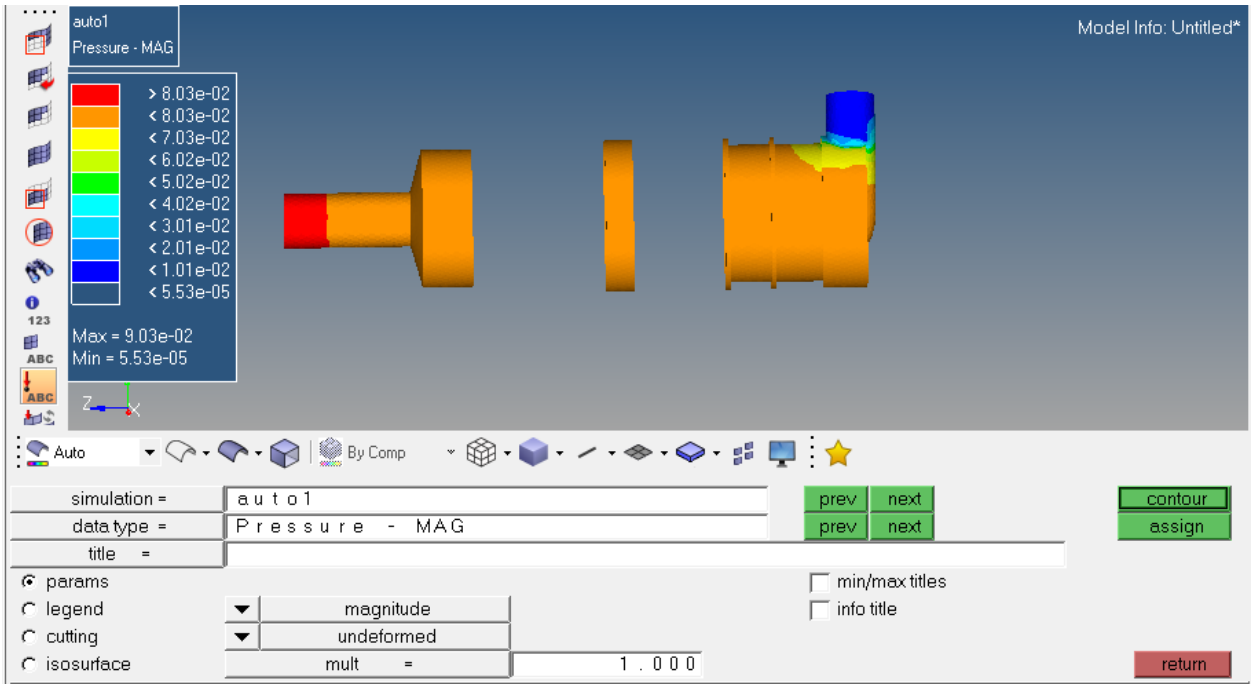
*The **search radius** is a search distance to find the loads which are within that distance from a centroid or node on which a load is being interpolated. HyperMesh uses the nearest 3 loads located within that distance to create the load at the centroid or node by linear interpolation. Linear interpolation uses a triangulation method, so if it finds fewer than 3 loads within that distance no interpolation takes place. While reading the initial loads from a file, if linear interpolation is not possible because the search radius is too small, the original loads are simply applied to the nearest centroid or node.*



e. After giving all the necessary inputs, click on ***create*** to apply the pressure on the model.



f. To review contour plot of the model, go to ***BCs*** dropdown menu ***> BCs Contour***, select the load collector from the ***BCs Contour*** menu (in the Tab area), and click on ***Accept***.
After giving any other necessary inputs in the panel, click on ***Contour***.



Step 3: compare result with AcuFieldview as well.