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HyperWorks

Altair HyperStudy 2019 Tutorials

HS-1025: Working with a HyperMesh and HyperMorph Model

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In this tutorial you will learn how to import size and shape variables to HyperStudy from HyperMesh. The input variables are three shape variables; xtrans, ytrans and radius. Each of these shapes are created by perturbing the mesh in the corresponding directions by 1 unit.

The sample base input template used in this tutorial can be found in `<hst.zip>/HS-1025/`. Copy the tutorial files from this directory to your working directory.

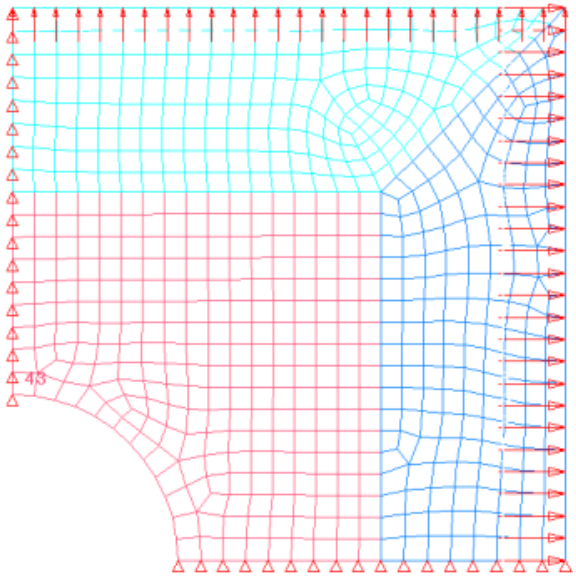


Figure 1: Double Symmetric Plate Model

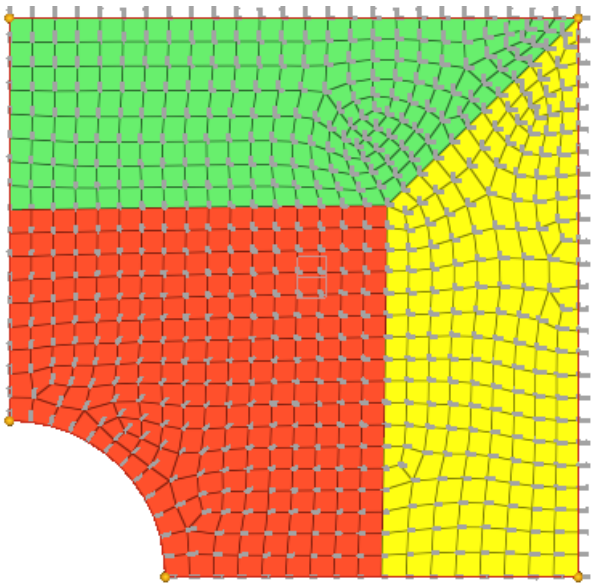
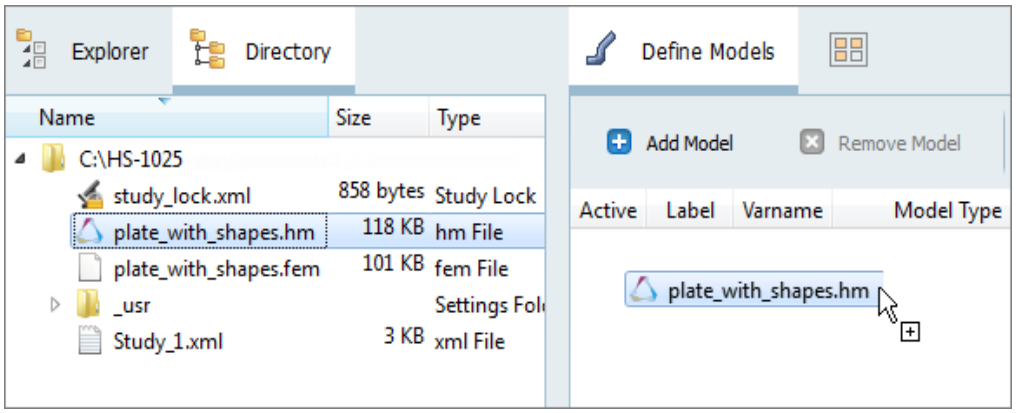


Figure 2: Double Symmetric Plate Model with Shape Vectors

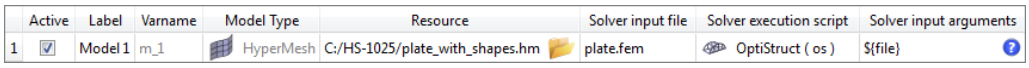
Step 1: Perform the Study Setup

1. Start HyperStudy.
2. To start a new study, click ***File*** > ***New*** from the menu bar, or click on the toolbar.
3. In the **HyperStudy – Add** dialog, enter a study name, select a location for the study, and click ***OK***.
4. Go to the **Define Models** step.
5. Add a HyperMesh model.
   a. From the **Directory**, drag-and-drop the `plate_with_shapes.hm` into the work area.

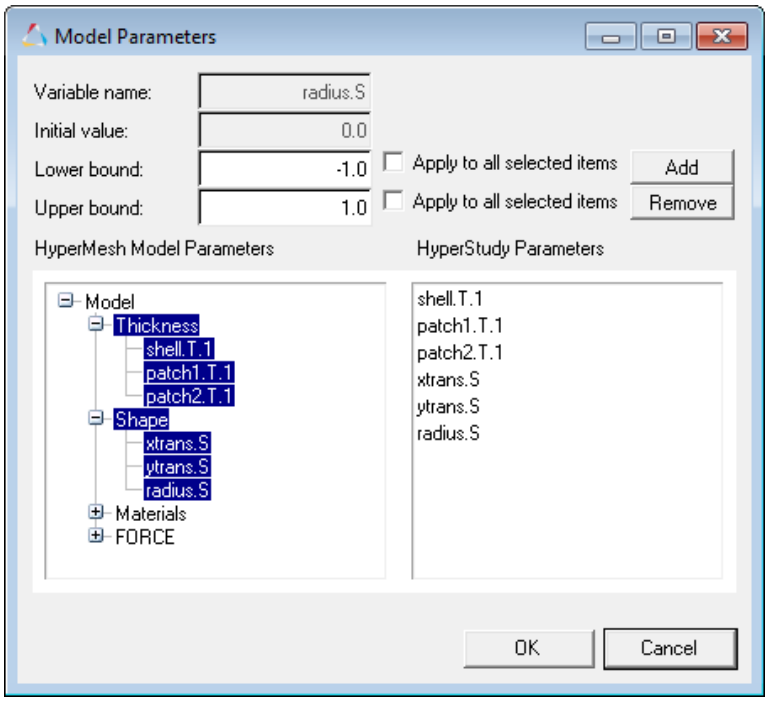


b. In the **Solver input file** column, enter `plate.fem`. This is the name of the solver input file HyperStudy writes during any evaluation.

c. In the **Solver execution script** column, select ***OptiStruct (os)***.



6. Click ***Import Variables***.
7. In the **Model Parameters** dialog, select parameters to import into HyperStudy.
   a. Select the thickness and shape variables. A total of 6 parameters should be selected.
   b. Click ***Add***.
   c. Click ***OK***.



8. Go to the **Define Input Variables** step.
9. Review the input variable's lower and upper bound ranges.
10. Go to the **Specifications** step.

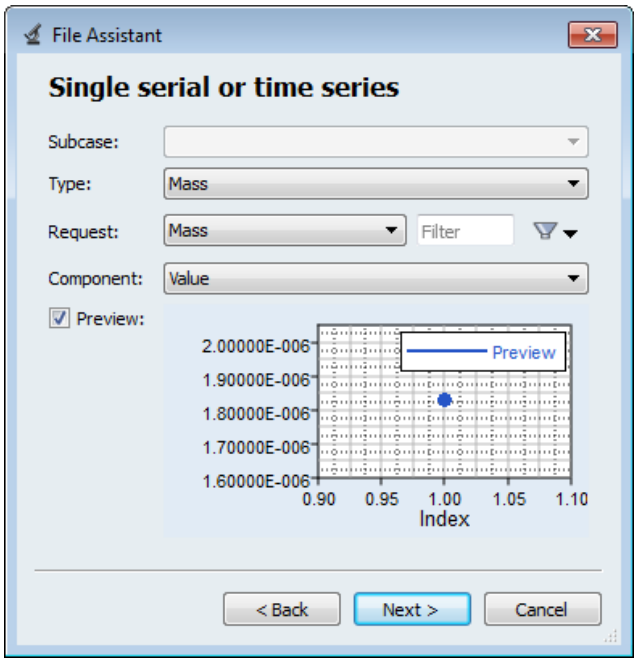
Step 2: Perform the Nominal Run

1. In the work area, set the **Mode** to ***Nominal Run***.
2. Click ***Apply***.
3. Go to the **Evaluate** step.
4. Click ***Evaluate Tasks***.
5. Go to the **Define Output Responses** step.

Step 3: Create and Define Output Responses

In this step you will create two output responses: Mass and Displacement.

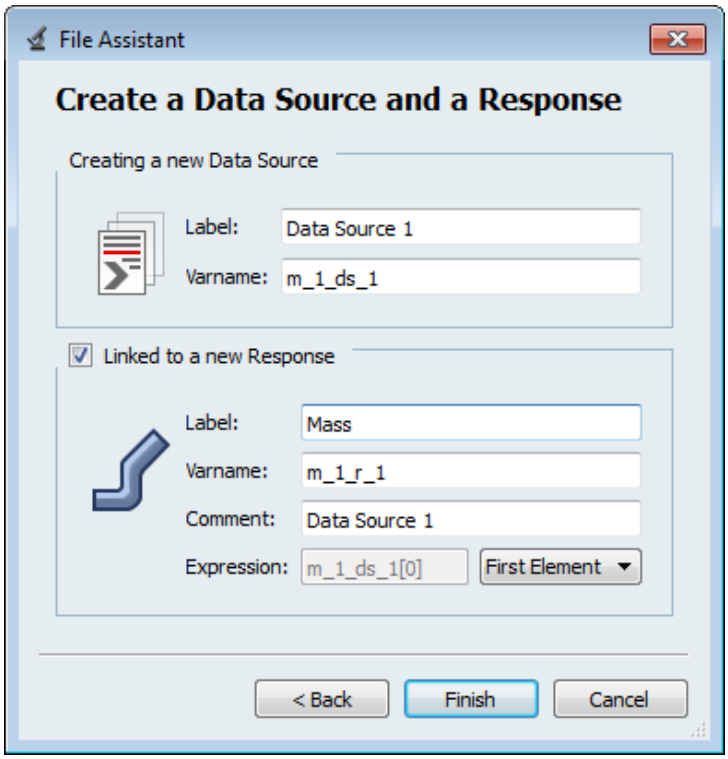
1. Create the Mass output response.
   a. From the **Directory**, drag-and-drop the `plate.out` file, located in `approaches/nom_1/run_00001/m_1`, into the work area.
   b. In the **File Assistant** dialog, set the **Reading technology** to ***Altair® HyperWorks®*** and click ***Next***.
   c. Select **Single item in a time series**, then click ***Next***.
   d. Define the following options, and then click ***Next***.
      - Set **Type** to ***Mass***.
      - Set **Request** to ***Mass***.
      - Set **Component** to ***Value***.



e. Label the output response Mass.

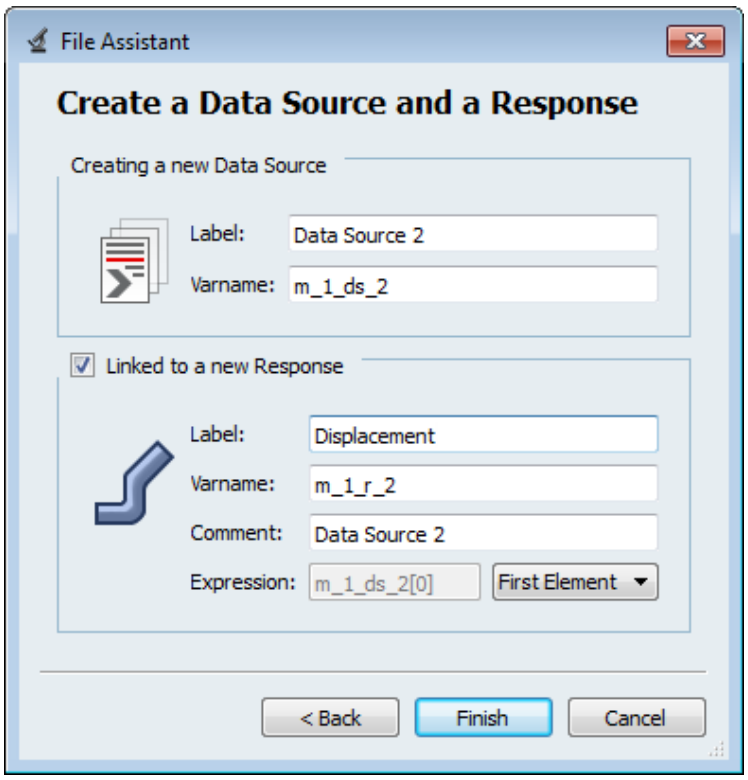
f. Set **Expression** to ***First Element***.

Note: Because there is only a single value in this data source, `[0]` is inserted after `m_1_ds_1`, thereby choosing the first (and only) entry in the data source.



g. Click ***Finish***. The Mass output response is added to the work area.

2. Create the Displacement output response.
   a. From the **Directory**, drag-and-drop the `plate.h3d` file, located in `approaches/nom_1/run_00001/m_1`, into the work area.
   b. In the **File Assistant** dialog, set the **Reading technology** to ***Altair® HyperWorks®*** and click ***Next***.
   c. Select ***Single item in a time series***, then click ***Next***.
   d. Define the following options, and then click ***Next***.
      - Set **Subcase** to ***Subcase 1 (Load)***.
      - Set **Type** to ***Displacement (Grids)***.
      - Set **Request** to ***N298***.
      - Set **Component** to ***MAG***.
   e. Label the output response Displacement.
   f. Set **Expression** to ***First Element***.



g. Click ***Finish***. The Displacement output response is added to the work area.

3. Click ***Evaluate*** to extract the output response values.

	Active	Label	Varname	Expression	Value	Comment
1	☑	Mass	m_1_r_1	m_1_ds_1[0] ...	1.83e-06	Data Source 1 ...
2	☑	Displacement	m_1_r_2	m_1_ds_2[0] ...	0.0024906	Data Source 2 ...

4. Proceed to the desired study type (DOE, Optimization, of Stochastic study).

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