Altair

HyperWorks

Altair HyperStudy 2019 Tutorials

HS-1515: Using HyperView Results Math Integration for Output Response Extraction

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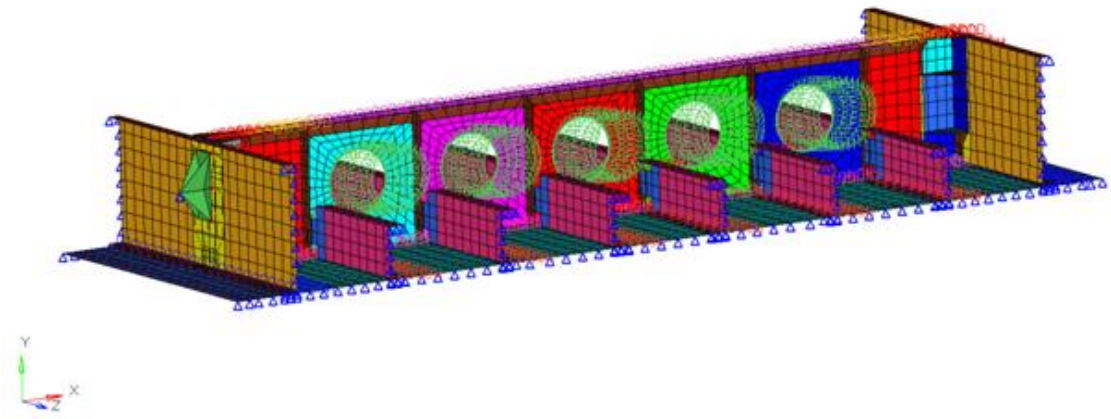
In this tutorial, you will learn how to:

- Setup a study
- Add a model
- Add output responses using Results Math

This tutorial runs a simple DOE study to showcase the process to use HyperView Results Math to extract output responses. This feature enables you to write an `.xml` file which queries the solver input and output files and then extracts the output responses in HyperStudy. This route queries the result faster and is considerable faster way to extract output responses of a group of elements or nodes than "readsim" function.

The files used in this tutorial can be found in `<hst.zip>/HS-1515/`. Copy the tutorial files from this directory to your working directory.

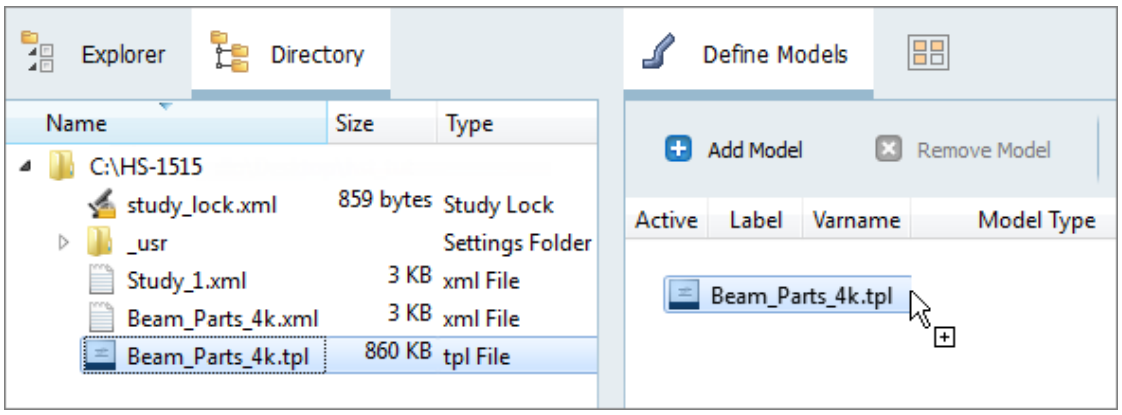


Step 1: Perform the Study Setup

This setup requires you to add a study and load the input file into HyperStudy. The input variables for the DOE study are selected as factors. A nominal run is performed (with OptiStruct as the solver), and the output responses for the DOE study are selected (in this case: Max stress of two different parts).

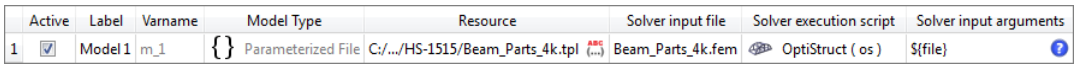
1. Start HyperStudy.
2. To start a new study, click ***File*** > ***New*** from the menu bar, or click on the toolbar.
3. In the **HyperStudy – Add** dialog, enter a study name, select a location for the study, and click ***OK***.
4. Go to the **Define models** step.
5. Add a Parameterized File model.
   a. From the **Directory**, drag-and-drop the `Beam_Parts_4k.tpl` file into the work area.

Note: The xml file needs to be copied to each run directory. A new batch file will copy the xml file to each directory, and then execute the OptiStruct job that needs to be registered.



b. In the **Solver input file** column, enter `Beam_Parts_4k.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. Define a model dependency.
   a. Click ***Model Resources***.
   b. In the **Model Resource** dialog, click ***Add Resource*** > ***Add Input Resource***.
   c. In the **Select File** dialog, navigate to your working directory and open the `Beam_Parts_4k.xml` file.
   d. Set **Operation** to ***Copy***.
   e. Click ***Close***.
7. Click ***Import Variables***. Two input variables are imported from the `Beam_Parts_4k.tpl` file.
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

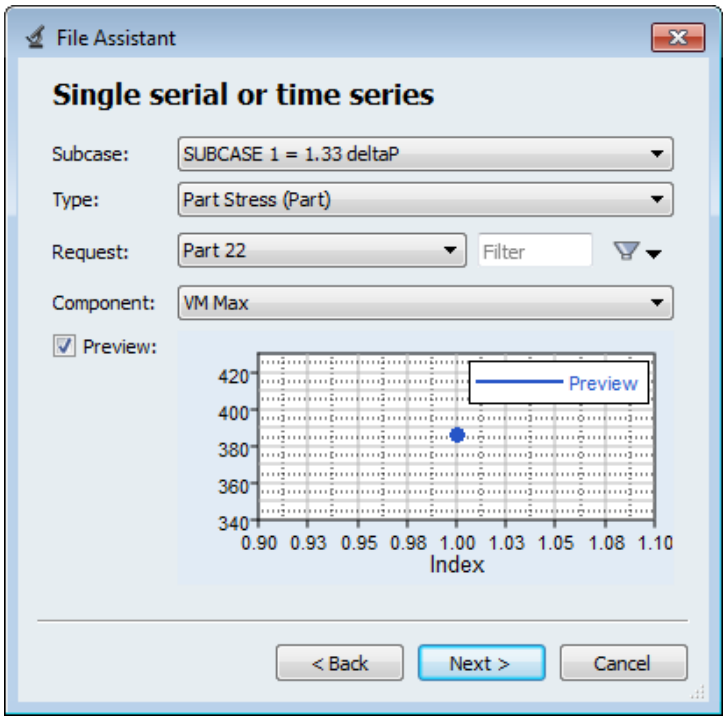
1. In the work area, set the **Mode** to ***Nominal Run***.
2. Click ***Apply***.
3. Go to the **Evaluate** step.
4. Click ***Evaluate Tasks***. An `approaches/nom_1/` directory is created inside the study directory.

5. Go to the **Define Output Responses** step.

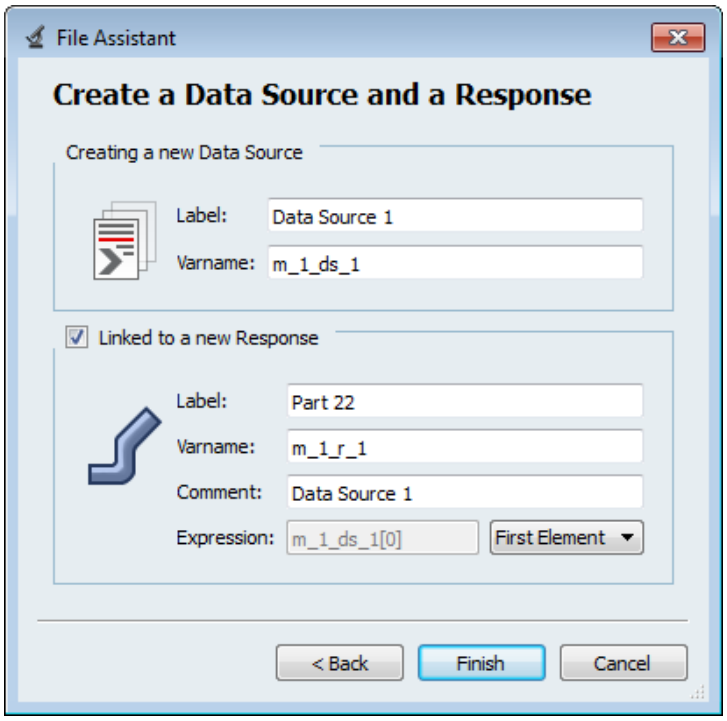
Step 3: Create and Define Output Responses

In this step you will create two output responses: Part 22 and Part 24.

1. Create the Part 22 output response.
   a. From the **Directory**, drag-and-drop the `Beam_Parts_4k.xml` 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 = 1.33 deltaP***.
      - Set **Type** to ***Part Stress (Part)***.
      - Set **Request** to ***Part 22***.
      - Set **Component** to ***VM Max***.

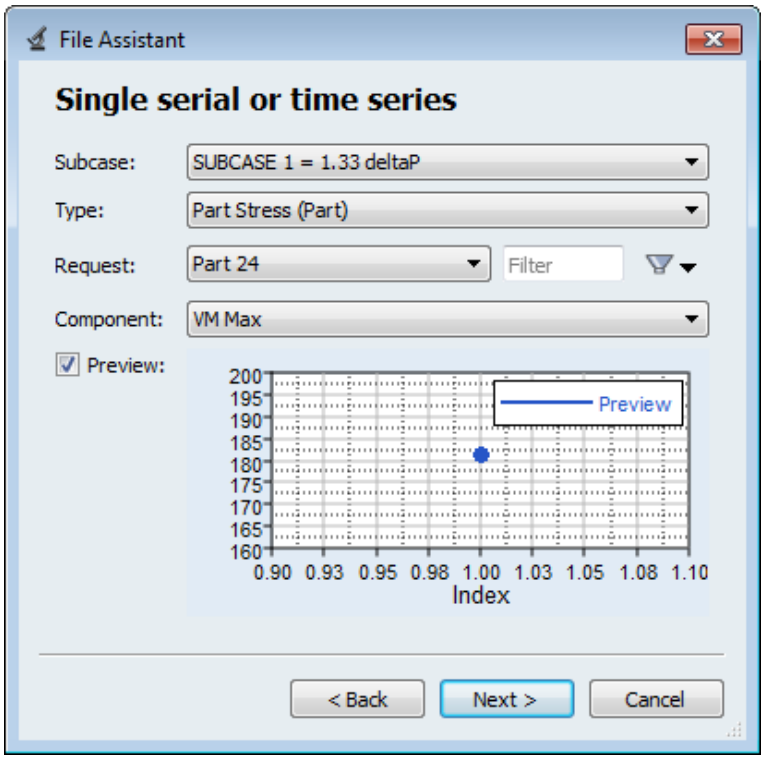


   e. Label the output response Part 22.
   f. Set **Expression** to ***First Element***.



g. Click ***Finish***. The Part 22 output response is added to the work area.

2. Create the Part 24 output response by repeating step 1. Change the **Request** to ***Part 24***.



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

	Active	Label	Varname	Expression	Value	Comment
1	☑	Part 22	m_1_r_1	m_1_ds_1[0] ...	385.95584	Data Source 1 ...
2	☑	Part 24	m_1_r_2	m_1_ds_2[0] ...	181.50389	Data Source 2 ...

4. Click ***OK***. This complete the study setup.

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