Altair HyperGraph 2D Tutorials

HG-1000: Plotting XY Data

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In this tutorial you will learn how to:

- Plot curves from files.

- Plot multiples curves in one window.

- Plot multiple curves in multiple windows.

- Use the **Advanced Plot Options** dialog to change the curve and plot attributes

Tools

The **Build Plots** panel can be accessed one of the following ways:

- Click the ***Build Plots*** icon,

 OR
- From the menu bar, select ***Curves > Build Plots***.

This panel allows you to construct multiple curves and plots from a single data file. Curves can be overlaid in a single window or each curve can be assigned to a new window.


The **Advanced Options** feature on the **Build Plots** panel allows you to apply many options at once to the session during plotting. Curves created in this manner are added to the session in a new layer.

From the **Build Plots** panel, click *Adv. Options* to display the **Advance Plot Options** dialog.
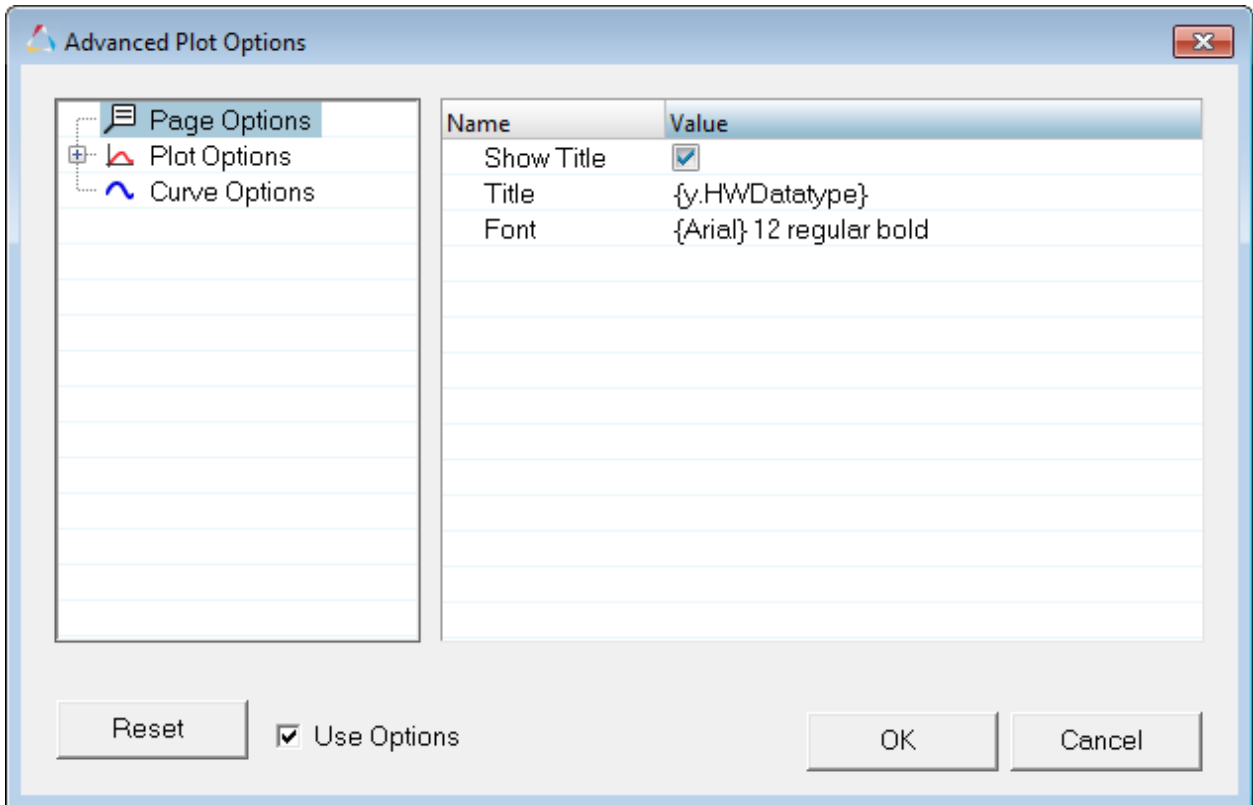
The **Multiple File Plotting** dialog allows you to select multiple files with intersecting data (for example, multiple runs of a particular test) and plot the data from all files simultaneously in the current HyperGraph session.

To access the **Multiple File Plotting** dialog, click the *Multiple File Plotting* button, , on the **Build Plots** panel.
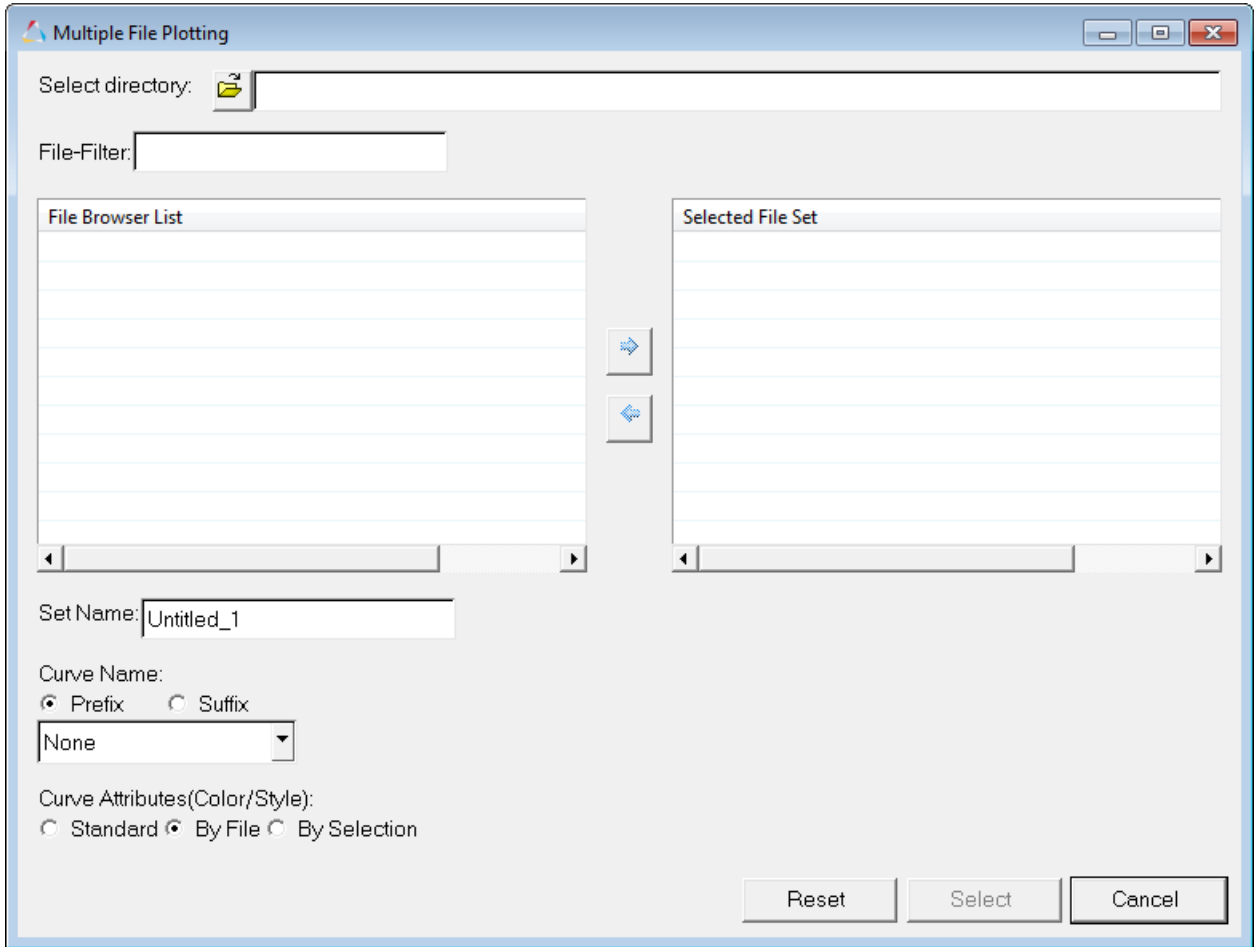
## Exercise: Creating XY Curves from Data Files

Step 1:   Open the demo.dat file.

1. From **File** menu, select ***New > Session*** to clear all contents in the HyperGraph session.

2. Verify ***XY Plot*** is selected from the plot type menu, ⌐.

3. Click the ***Build Plots*** icon, 📊 .

4. Click the ***Open File*** button, 📂, and select the `demo.dat` file, located in the `plotting` folder.

Step 2:   Build multiple curves on a single plot.

1. For **X type:** select ***Time***.

2. From the **Y type:** column, select ***Force***.

    The data available in the file is listed under the **Y Request** column.

3. Under **Y Request:**, click the expansion button, ⌐, to easily view the **Y Request** list.

4. Under **Y Request:**, press and hold the CTRL key and select ***REQ/3 Curve 3, REQ/5 Curve 5, REQ/7 Curve 7,*** and ***REQ/9 Curve9.***

5. Click ***OK*** to close the expanded list dialog.

6. Under **Y Component:**, select ***X***.

7. Click ***Apply*** to create the curves on page 1.

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The plot's X axis is labeled **Time** (the *X type*), while the y axis is labeled **Force** (the *Y type*). The plot's title is ***X*** (the *Y Component* name). The curve's names are the Y Request names.
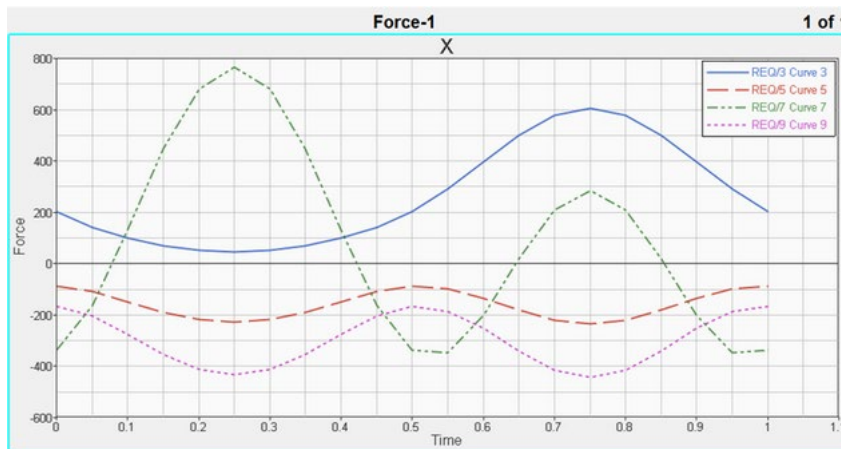
Step 3: Build multiple curves on multiple plots.

While in the **Build Plots** panel, do the following:

1. Verify ***X type: Time*** is selected.

2. Under **Y type:**, leave ***Force*** selected.

3. Under **Y Request:**, leave ***REQ/3***, ***REQ/5***, ***REQ/7***, and ***REQ/9*** selected.

4. Under **Y Component*:***, press the CTRL key and select ***Y*** and ***Z*** to add them to the already selected ***X.***

   -Or-

   Press the SHIFT key and select ***Z***. This selects ***Z*** and everything between **X** and **Z**.

   -Or-

   Left click on ***X*** and drag the mouse down to ***Z***.

5. From the **Layout*:*** drop-down menu, select ***One plot per Request***.

   This option creates one plot for each selected Y request. Each plot contains as many curves as there are selected Y components. The plot's title is the **Y Request** name. The curve's label is the **Y Component** name.

6. Click the ***Page Layout*** button, ⬜, and select the four-window layout from the panel area.

7. Click ***Apply*** to create the plots and curves on page 2.
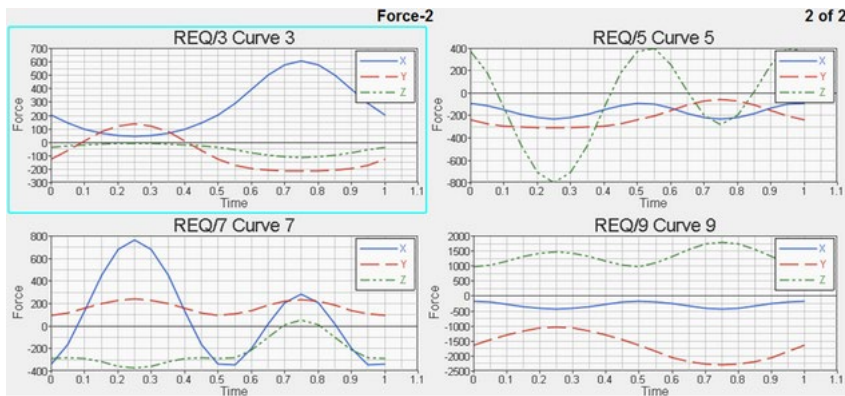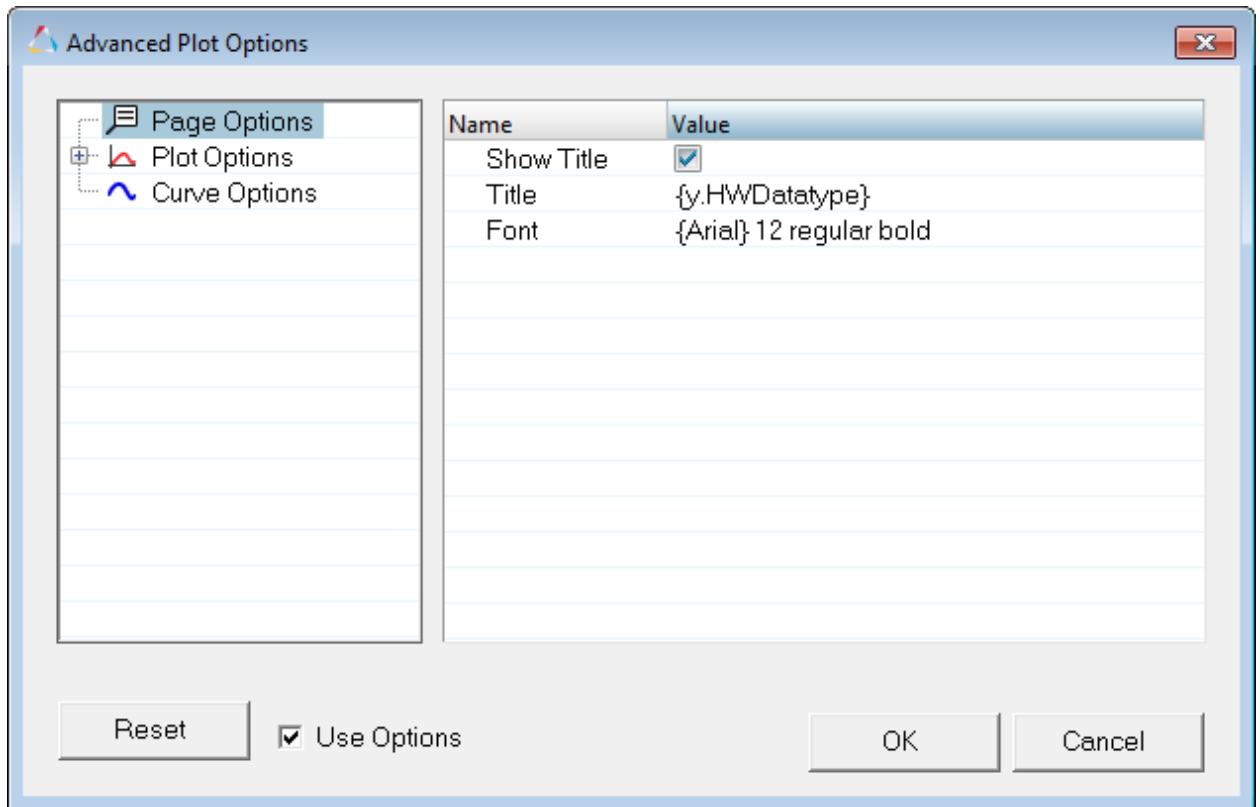

Step 4: Use Advanced Options to change the curve and plot display attributes.

While in the **Build Plots** panel, do the following:

1. Keep the curves you created in Step 3.

2. Click ***Adv. Options***.

The **Advanced Plot Options** dialog is displayed.

3. To change the page title font, click *Page Options* on the left side of the dialog.

4. Click in the *Font* field on the right side of the dialog.   Next, click the **Font** icon, ⒜, to display the **Font** dialog.   Change the font size to `16`.

5. Under **Plot Options**, select *Header*.

6. Click in the *Header* field on the right side of the dialog to activate the drop-down menu. Deselect **Y-Component**.

    This will remove the Y component from the header.

7. Select *Horizontal Axis* from the left side of the dialog.   Click in the *Font* field on the right side of the dialog.   Next, click the **Font** icon, ⒜, to display the **Font** dialog.

8. From the **Font** dialog, change the font size to `12`.

9. Repeat steps 7 and 8 the **Vertical Axis**.

10. Select *Legend* from the left side of the dialog.

11. From the **Font** dialog, change the legend font size to `10`.

12. Select *Curve Options* from the left side of the dialog.

13. Click in the *Label* field on the right side of the dialog to activate the drop-down menu. Deselect **Y Request**.

    This removes the Y request from the label.

14. Activate *Show Prefix*.

15. Click the *Label Prefix* field.   Once the cursor is displayed, enter `Test 17`.

16. Click *OK* to exit the **Advanced Options** dialog.

17. From the **Build Plots** panel, click **Apply**.
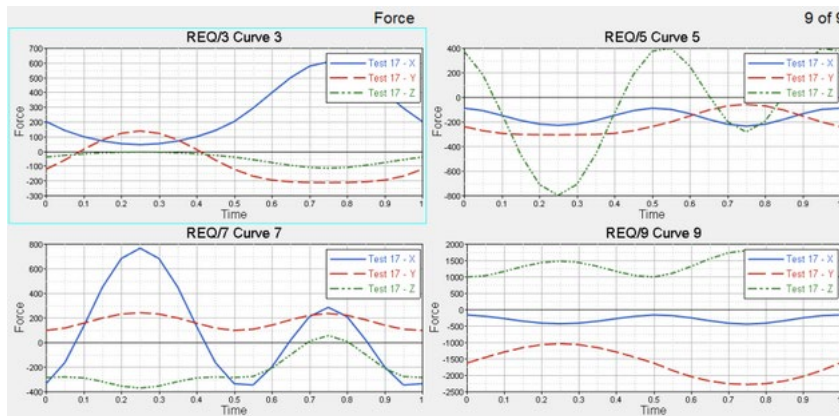
You can also perform filtering on the curve.   For this, retain the curve and plot modifications you just performed.

18. From the **Build Plots** panel, select **Adv. Options**.

19. Click **Curve Options** on the left side of the dialog.

20. Activate **Math Expression**.

21. Leave **Expression for x** as is.

22. Enter the following filter in the **Expression for y** field: `saefilt95(u,v,60,5,3).`

23. Click **OK**.

24. From the **Build Plots** panel, click **Apply**.

25. From **Define Curves** panel, ✎ you will see the filter you applied display in the y vector field:

### Step 5: Use Multiple File Plotting to plot multiples curves in one plot.

1. From **File** menu, select **New > Session** to clear all contents in the HyperGraph session.

2. Verify **XY Plot** is selected from the plot type menu, ⌃.

3. Click the **Build Plots** icon .

4. Next to **Data File**, click the **Multiple File Selection** icon, .

   The **Multiple File Plotting** dialog is displayed.

5. Next to **Select directory**, click the **Open File** button, 📂, and select the `MultipleFiles` folder, located in the `plotting` folder.
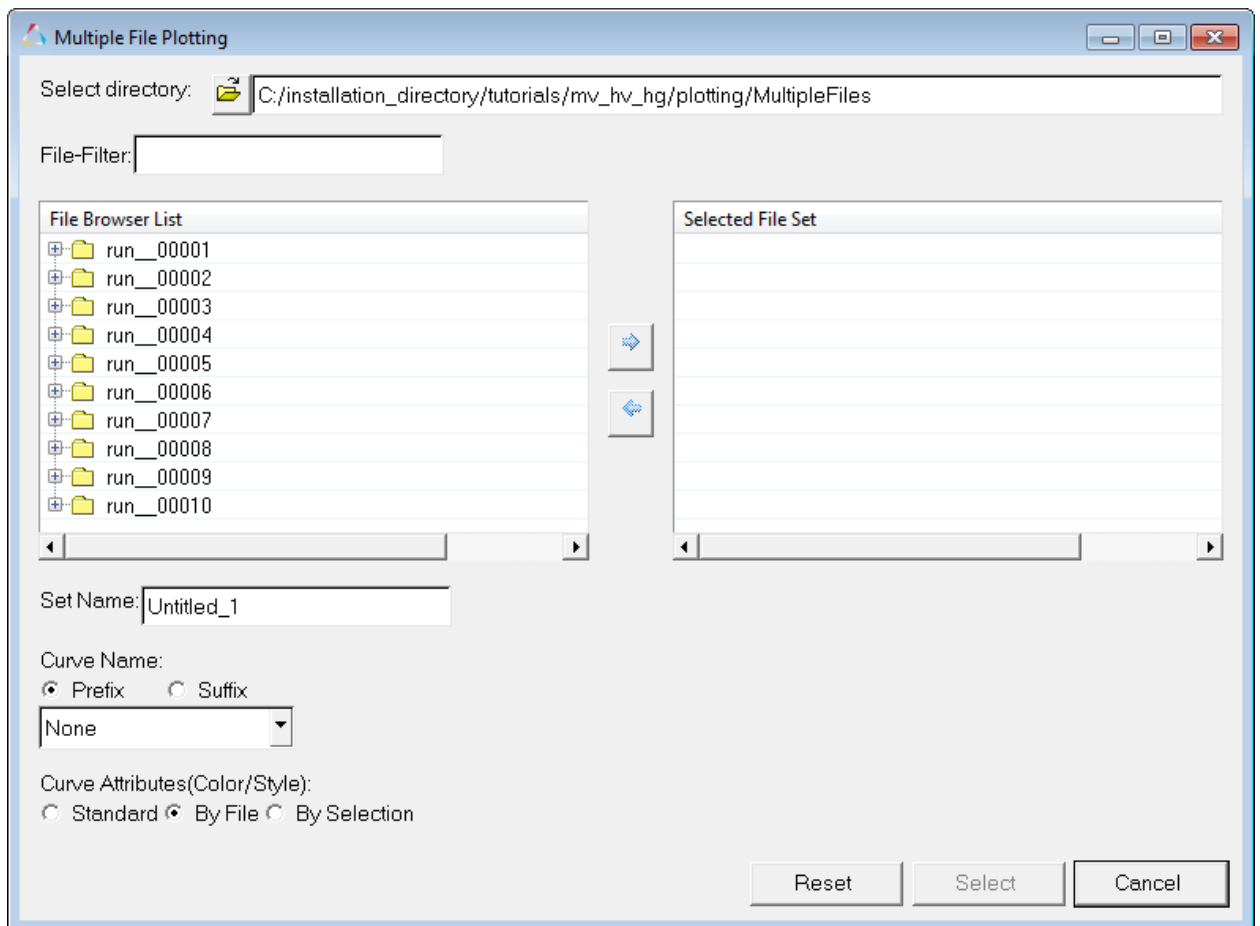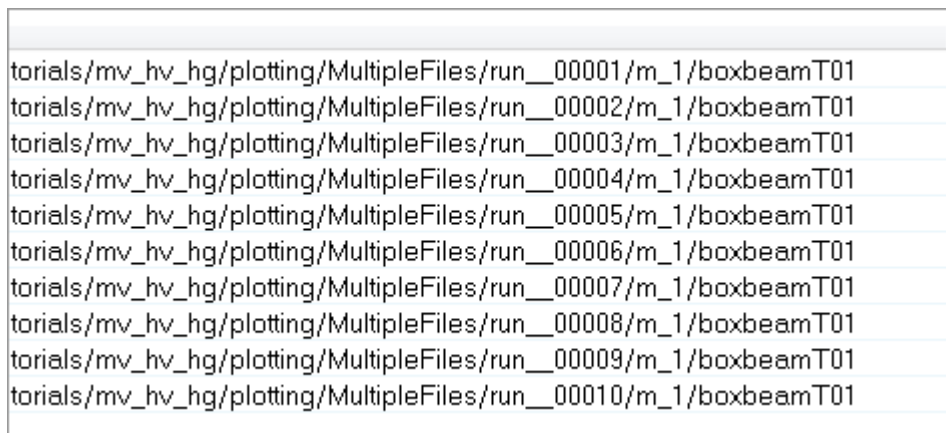
6. You can expand the folders in the **File Browser List** to display the files contained in each folder.
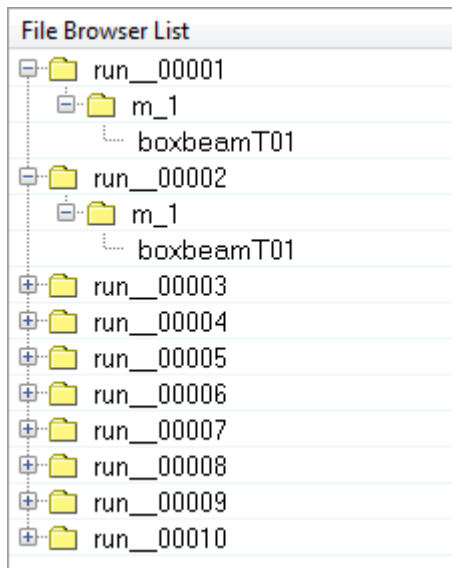
You can select files from the File Browser List and click the arrow, , to move them to the **Selected File Set**. For this tutorial, we will filter them.

7. In the **File-Filter** field, enter `*T01` and press ENTER. The following files are displayed:


8. While holding the CTRL button, select the first eight files listed under **File Browser List** and click the right-facing arrow, , to move them to the **Selected File Set**.

9. Under **Curve Name**, leave **Prefix** activated and select *Directory Level 2* from the drop-down menu.
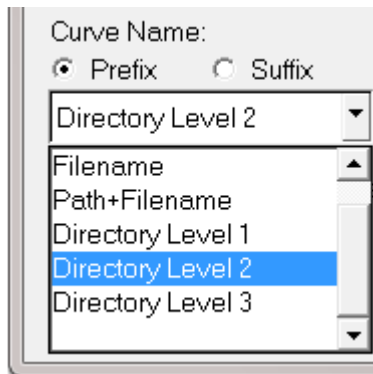
10. Under **Curve Attributes (Color/Style)**, leave *By File* selected.

11. Click *Select* to exit the dialog.

12. From the **Build Plots** panel, make the following selections:

    o For **Y Type:**, select *Global Variables*.

    o For **Y Request**:, select *Internal Energy* and *Kinetic Energy*.

    o For **Y Component:**, select *MAG*.

13. From the **Layout***:* drop-down menu, select *One plot per Request*.

14. Click the *Page Layout* button, □, and select the two-window layout from the panel area.

15. Click *Apply*.
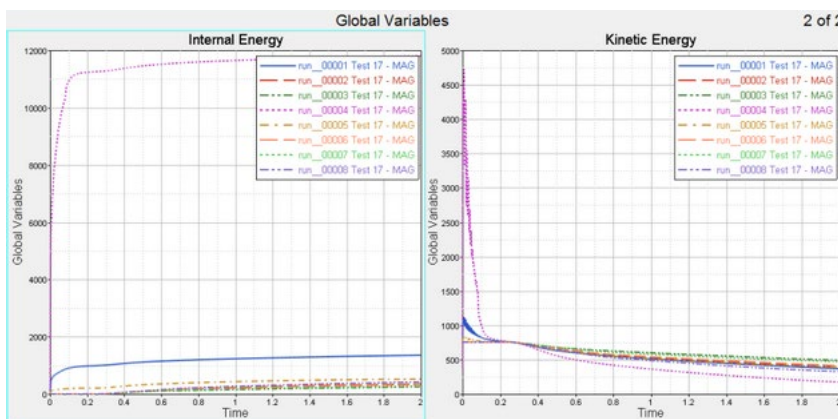
16. You can also view the curve **Label Prefix** and **Label** information in the Plot Browser. These fields were edited using the **Advanced Options** dialog in Step 4.