



Altair

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**HyperWorks**

Altair HyperGraph 2D 2019 Tutorials


HG-1030: Referencing and Filtering Curves

# HG-1030: Referencing and Filtering Curves

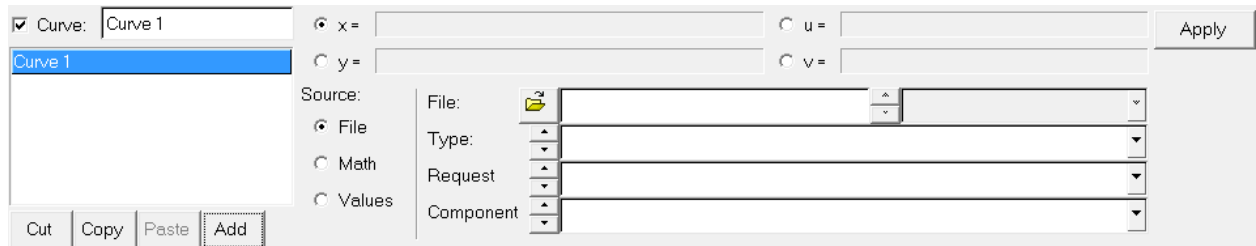
In this tutorial you will learn how to reference and filter curves.

## Tools

The **Define Curves** panel can be accessed in one of the following ways:

- Click on the **Define Curves** icon, 
- Or
- From the menu bar select **Curves > Define Curves**.

This panel allows you to edit existing curves and create new ones. The **Define Curves** panel also provides access to the program's curve calculator.



## Referencing Curve Vectors in HyperGraph

X and y vector expressions can reference any curve vector in the session. A curve vector reference defines the x or y vector (values) by page, window, and curve number. An example of a curve vector reference is **p2w3c4.x**, where:

p2	is page 2
w3	is window 3
c4	is curve 4
x	is the vector

There are two common methods to specify curve vector references:

Pick a curve in a plot window	For the <b>x =</b> input field.	SHIFT and pick the curve to get the curve x vector reference
		SHIFT + CTRL and pick the curve to get the curve y vector reference
	for <b>y =</b> input field.	SHIFT and pick the curve to get the curve y vector reference
		SHIFT + CTRL and pick the curve to get the curve x vector reference


Select a curve vector reference from the **Curves...** dialog, which is accessed from the **Define Curves** panel.

## Exercise: Filtering a curve from the Define Curves panel

### Step 1: Open Session File saefilter.mvw

1. From the **File** menu, click **Open > Session**.
2. From the plotting folder, select the saefilter.mvw file and click **Open**.

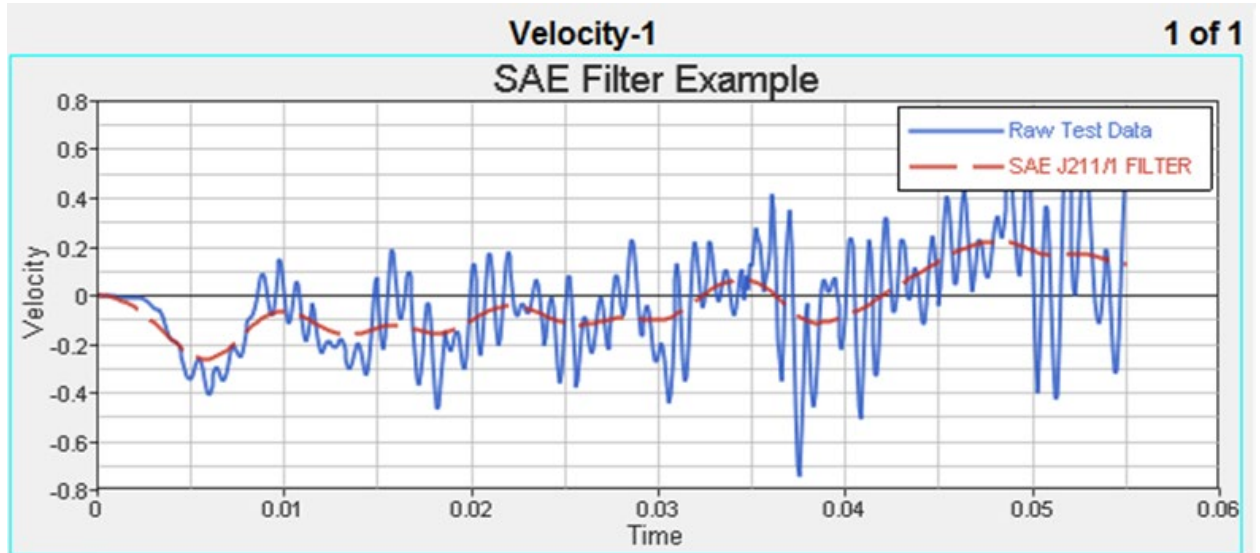
### Step 2: Filter a curve using the SAE J211/1 filter.

1. Click on the **Define Curves** panel icon, .
2. Click **Add** and add a new curve.
3. Change the name of the new curve from **Curve 1** to SAE J211/1 FILTER in the text box over the curve list.
4. Check the radio button for **Math** under **Source**.
5. Verify that the **x** vector is active.
6. Hold the SHIFT key and click on the curve in the plot window.  
The **x =** curve reference is p1w1c1.x.
7. Click the **y =** field, and click **Filter...** from the panel menu to display the **Filter** dialog.
8. Select the filter class **SAE J211/1** from the **Filter Class** drop-down menu.
9. Select **Filter Class: 60, Padding: Mirror padding**, and **Direction: Fwd-Back**.
10. Click **OK** to complete the selection and close the **Filter** dialog.
11. Hold down the SHIFT + CTRL keys, then select the existing curve.
12. The x vector curve reference is entered in the **saefilt95** function.

13. Hold down the SHIFT key and select the curve again.


**Note:** the curve's y vector is referenced in the **saefilt95** function. The **y =** field should read: **saefilt95(p1w1c1.x,p1w1c1.y,60,1,3)**.


14. Click **Apply** to create the filtered curve.

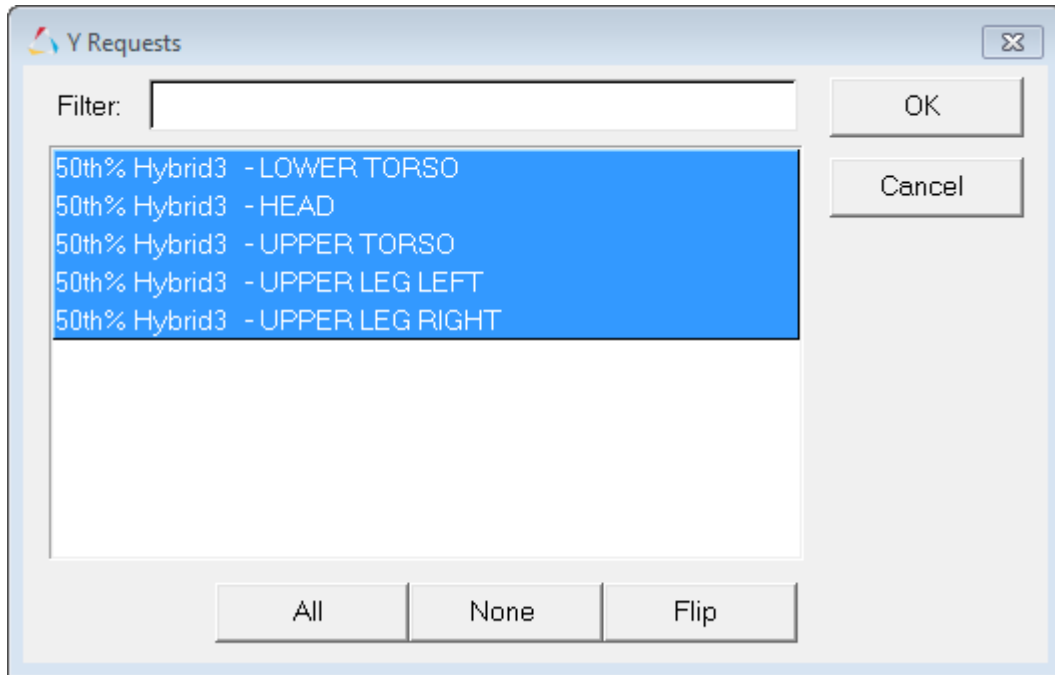


## Exercise: Filtering a curve using the Vehicle Safety Tools and Plot Macros panel

### Step 1: Load the ANGACC file.

1. From the **Options** panel, verify that **Enable Unit Scaling** is selected.
2. From the toolbar, click **Add Page**, .
3. From the **Built Plots** panel, load the ANGACC file, located in the `..\plotting\madymo` folder.

4. Click the expand button, , to display the **Y Requests** dialog. Click **All** to select all the requests listed.

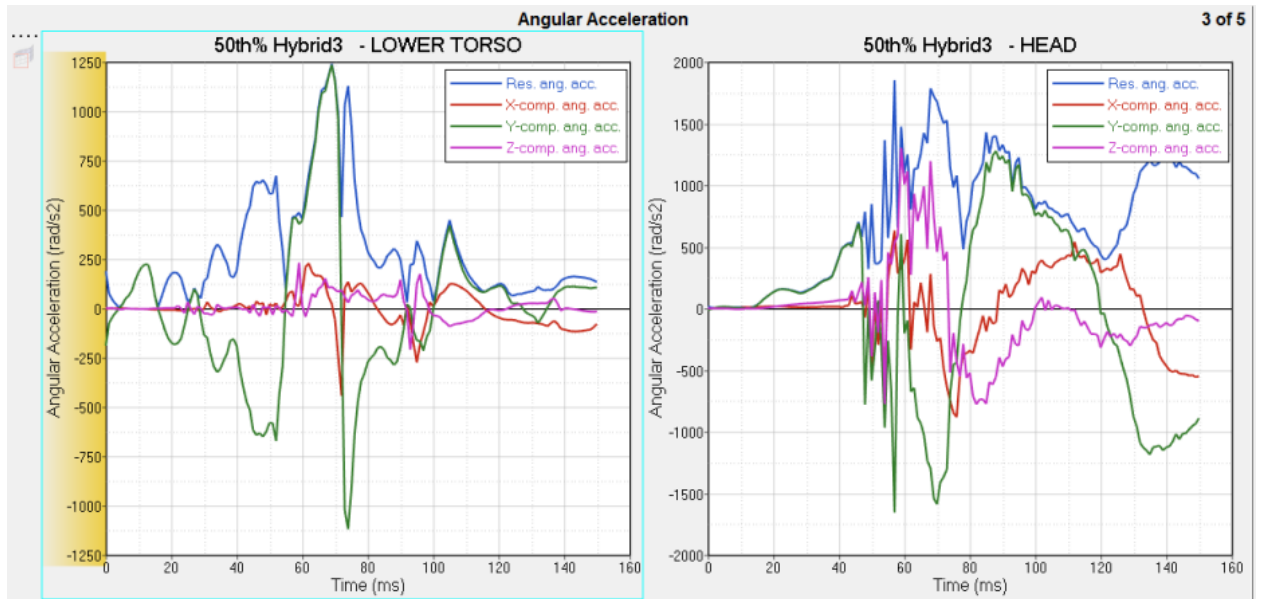



5. Click **All** to select all the requests listed. Click **OK** to close the dialog.
6. Under **Y Component**, click **All** to select all components in the list.
7. From the **Layout** drop-down menu, select **One Plot Per Request**.
8. Click the window layout icon and choose the two-window layout.



9. Click **Apply**.

The following plots are displayed:



10. Click the **Next Page** icon, , to view the other curves on pages 4 and 5 that were created in step 8.

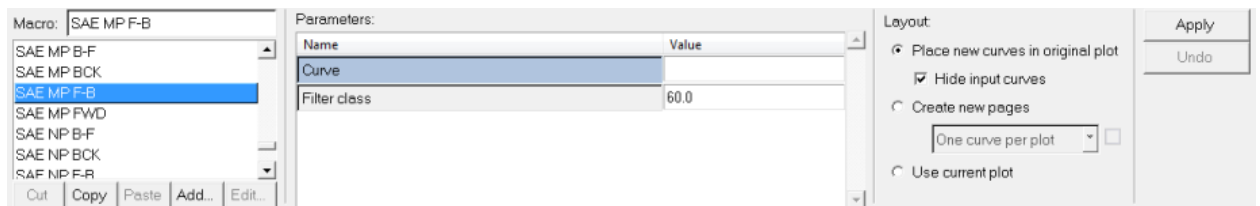
### Step 2: Filter a curve using the SAE J211/1 filter through the Vehicle Safety Tools menu.

1. Select **File > Load > Preference File**.
2. From the **Preferences** dialog, select **Vehicle Safety Tools** and click **Load**.

The **Vehicle Safety Tools** menus are displayed in the menu bar.

3. From the **Filter** menu, select **SAE General > SAE (J211, Mar 1995) > Mirror Padding > Fwd-Back**.

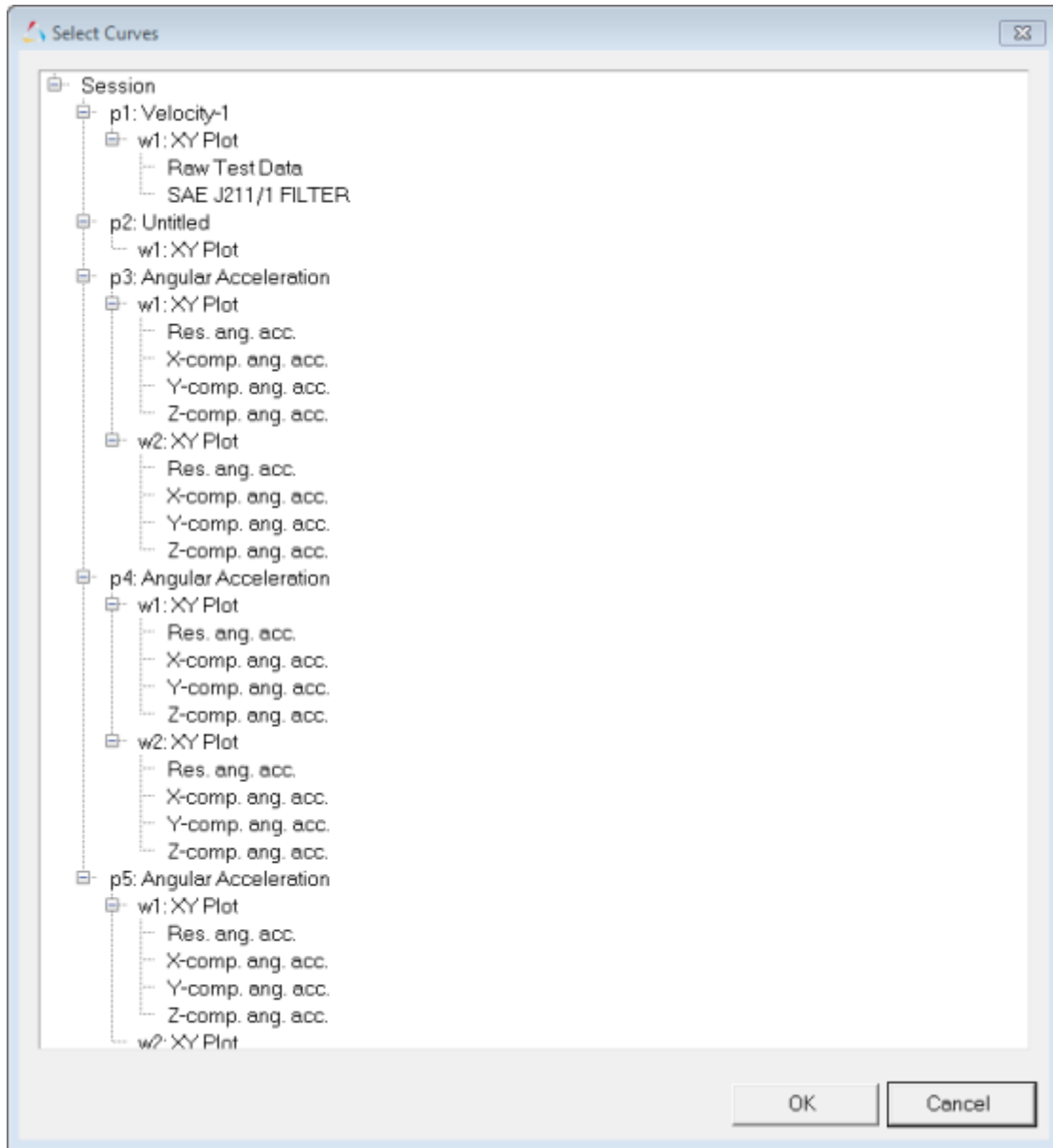
The **Plot Macros** panel is displayed.



4. For **Filter class**, change the value to 180.

Note: Time scaling is done automatically since Enable Units is activated from the Options panel.

- To select all the curves at once, double-click **Curve** to display the **Select Curves** dialog.



- To select the curves on pages 3-5, select **p3: Angular Accelaration**, hold down the SHIFT key, and select **Z-comp ang. acc.** under **p5: Angular Acceleration**.

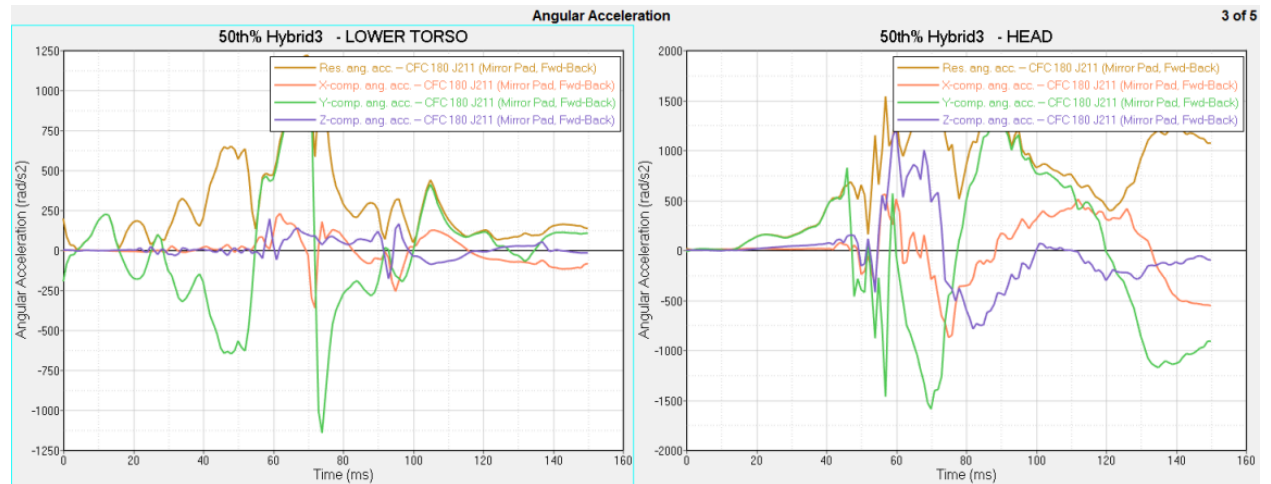

All of the master references are inserted into the Curve field.

Name	Value
Curve	p3w1c1,p3w1c2,p3w1c3,p3w1c4,p3w2c1,p3w2c2,p3w2c3,p3w2c4,p4w1c1,p4w1c2,p4w1c3,p4w
Filter class	180

- Under **Layout**, select **Hide Input Curves**.

8. Click **Apply**.

All curves are filtered.

9. Click  to view the remaining curves on pages 4 and 5.

10. The automatic unit scaling allows you to change the time from milliseconds to seconds, for example, without changing the curves.

11. Right-click from the X axis and from the **Convert Units** menu, select **s**. The curves remain the same as when **Time** was set to milliseconds.