



Altair

HyperWorks

Altair HyperGraph 2D 2019 Tutorials

HG-2010: Creating a Plot Macro

HG-2010: Creating a Plot Macro

In this tutorial you will learn how to:

- Create a plot macro
- Append and use the **Vehicle Safety Tools**

Tools

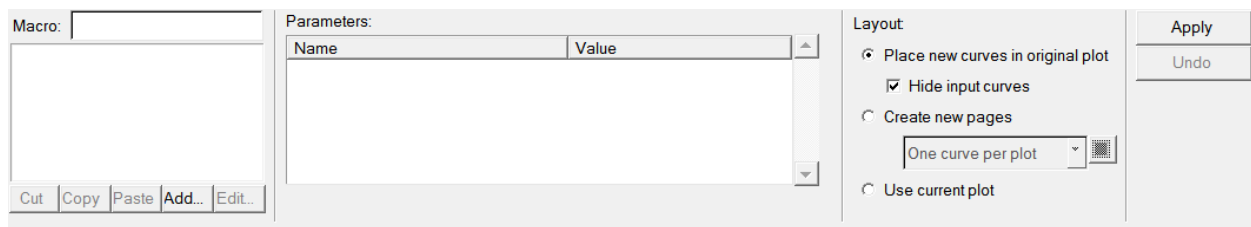
The **Plot Macro** panel can be accessed in one of the following ways:

- Click the **Plot Macros** icon, 

Or

- From the menu bar select **Curves > Plot Macros**

This panel allows you to create macros that produce curves and notes for plots. Plot macros can be used to capture and replay frequently used curve operations such as adding two curves together and filtering curves.



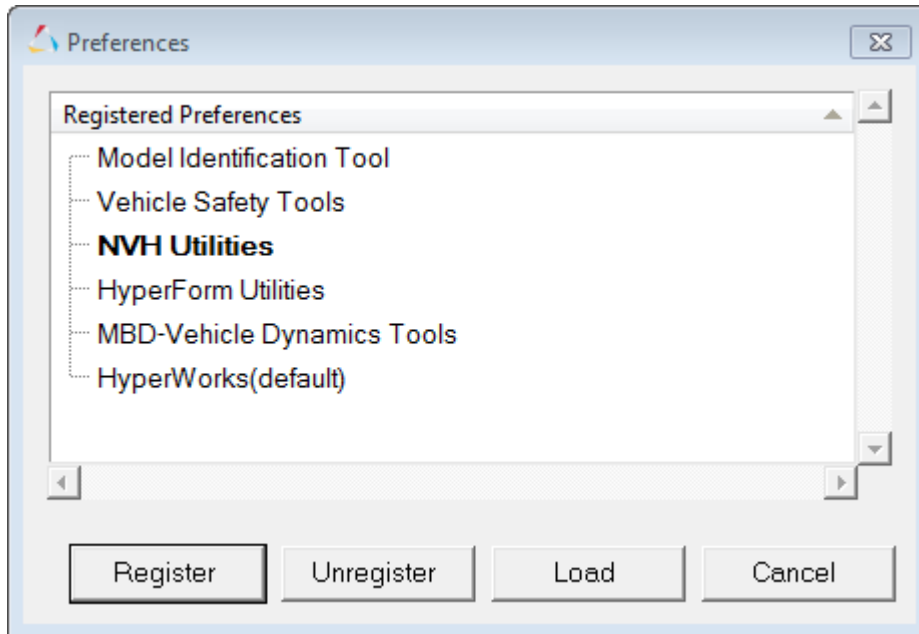
Defining a plot macro consists of two steps:

1. Define the parameters (variables of type curve or scalar) needed to create the curve.
2. Define the curve using the parameters.

Plot macros created from the **Plot Macros** panel are saved to the session file.

To load Vehicle Safety Tools:

1. From the menu bar select **File > Load > Preference File**.
2. Select the **Vehicle Safety Tools** preference file and then click **Load**.



The vehicle safety tools (VST) are a collection of over 200 macros, Templex functions, and external functions used by vehicle safety engineers. On appending the VST file, seven new menus that contain the macros and functions are displayed on the menu bar: **Math, Filter, Units, Injury, Misc, Transforms** and **Safety Tools**.

File Edit View Curves Annotations Tools Preferences Math Filter Units Injury Misc Transforms SafetyTools Applications Help


Selecting a tool (macro) from one of these menus takes you to the **Plot Macros** panel.

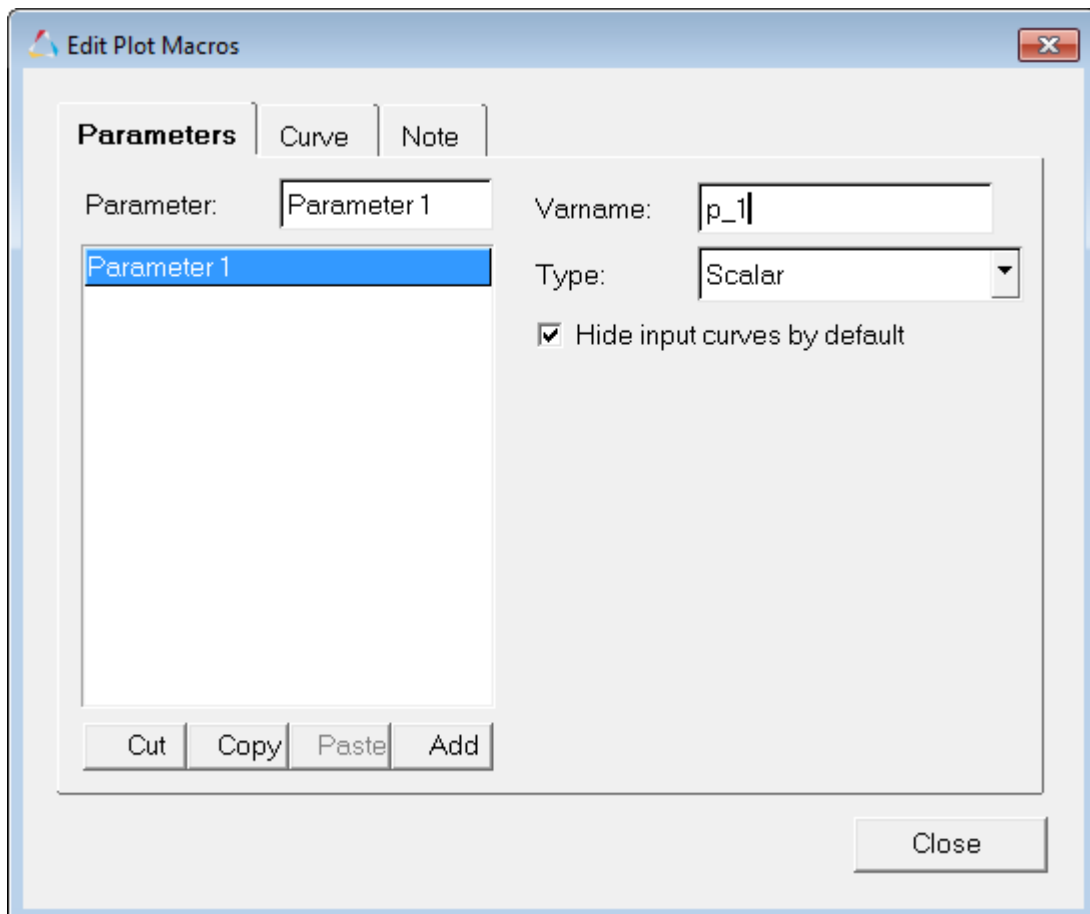
Context Sensitive Menu

When the VST are loaded, you can access its macros by right-clicking on a curve and selecting a macro from the pop-up menu. The pop-up menu can be customized.

Exercise: Create a Plot Macro for the SAE J211 Filter Function

Step 1: Define the macro's first parameter.

1. Click on the **Plot Macros** panel icon, .
2. Click **Add** to create a new macro and open the **Edit Plot Macro** dialog.
3. On the **Parameters** tab, click **Add** to create the first parameter.
A parameter named **Parameter1** is displayed in the **Parameters** list and is highlighted.
4. In the **Parameter:** field, replace the name **Parameter1** with `raw data curve` and then press ENTER.
5. In the **Varname:** field, replace the name **p_1** with `curve` and press ENTER.
The variable name references the parameter in the macro's definition.
6. Set the parameter's **Type:** to **Curve**.



Step 2: Define the macro's second parameter.

1. Click **Add** to create the second parameter.
2. In the **Parameter:** field, replace the name **Parameter2** with `SAE J211/1 filter class`.
3. In the **Varname:** field, replace the name **p_2** with `class`.
4. Set the parameter's **Type:** to **Scalar**.

Step 3: Define the macro's third parameter.

1. **Add** a third parameter.
2. Change the parameter's name to `padding`.
3. Change the parameter's variable name to `padding`.
4. Verify **Type:** is set to **Scalar**.

Step 4: Define the macro's fourth parameter.

1. **Add** a fourth parameter.
2. Change the parameter's name to `direction`.
3. Change the variable's name to `direction`.
4. Verify **Type:** is set to **Scalar**.

Step 5: Define the macro's curve label.

The curve label should be `curve.label+" SAE J211/1 "+class`.

1. From the **Curve** tab, click the **Label** field.
2. From the **Parameters** list, double-click **raw data curve**.
`curve.label` is displayed in the **Label** field.
3. In the **Label** field, add `+" SAE J211/1 "+`.
`curve.label+" SAE J211/1 "+` is displayed in the **Label** field. The + symbol connects the string of variables and text.
4. From the **Parameters** list, double-click **SAE J211/1 filter class**.
`curve.label+" SAE J211/1 "+class` is displayed in the **Label** field.

Step 6: Define the curve's x vector.

The curve's x vector should be **curve.x**.

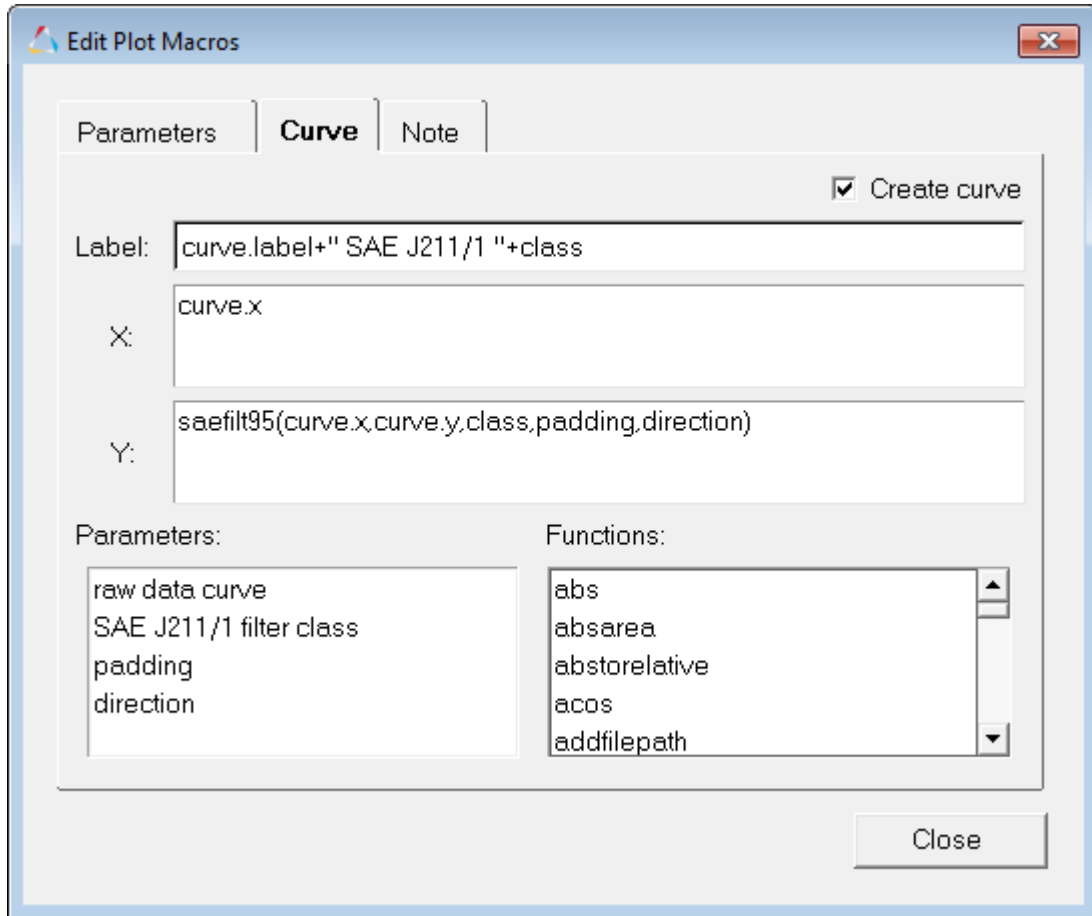
1. Click the **X:** field.
2. From the **Parameters** list, double-click **raw data curve**.
curve.x is displayed in the **X:** field.

Step 7: Define the curve's y vector.

The curve's y vector should be
saefilt95 (curve.x, curve.y, class, padding, direction).

1. Click in the **Y:** field.
2. From the **Functions:** list, double-click **saefilt95**.
saefilt95 (,,,,) is displayed in the **Y** field.
3. From the **Parameters** list, double-click **raw data curve**.
saefilt95 (curve.y,,,,) is displayed in the **Y** field.
4. In the **Y** field, change **curve.y** to **curve.x**.
5. Position the cursor after the first comma.
6. From the **Parameters** list, double-click **raw data curve**.
saefilt95 (curve.x,curve.y,,,,) is displayed in the **Y** field.
7. Position the cursor after the second comma.
8. From the **Parameters** list, double-click **SAE J211/1 filter class**.
saefilt95 (curve.x,curve.y,class,,) is displayed in the **Y** field.
9. Position the cursor after the third comma.
10. From the **Parameters** list, double-click **padding**.
saefilt95 (curve.x,curve.y,class,padding,) is displayed in the **Y** field.
11. Position the cursor after the fourth comma.
12. From the **Parameters** list, double-click **direction**.
saefilt95 (curve.x,curve.y,class,padding,direction) is displayed in the **Y** field.
13. **Close** the **Edit Plot Macro** dialog.
14. In the **Macro:** field, change the name **macro1** to **SAE J211/1 filter** and press ENTER.

15. Save the session file as SAEJ211_macro.mvw.



Step 8: Apply the SAE J211/1 filter macro.

1. From the menu bar, select **File > Open > Session** and select the file `saefilter.mvw`, located in the `plotting` folder.

Even though a new session file is opened, the `SAE J211/1 filter` macro remains in the session until HyperGraph is closed.

2. Enter the **Plot Macros** panel.
3. From the **Macro** list, select `SAE J211/1 filter`.
4. In the **Parameters** section of the **Plot Macros** panel, click the **raw data curve** field.
5. Hold the SHIFT key and select the curve in the plot window.
`p1w1c1` is displayed in the **raw data curve** field.
6. Enter `60` in the **SAE J211/1 filter class** field.
7. Enter `1` in the **padding** field.
8. Enter `3` in the **direction** field.
9. Verify the option **Layout: Place new curves in original plots** is active.
10. Deactivate the option **Hide input curves**.
11. Click **Apply** to create the filtered curve.

This plot macro can be reused for any number of input curves to quickly repeat the curve filtering process.