



Altair

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**HyperWorks**

Altair HyperView 2019 Tutorials

HV-3099: Creating Derived Results


## HV-3099: Creating Derived Results

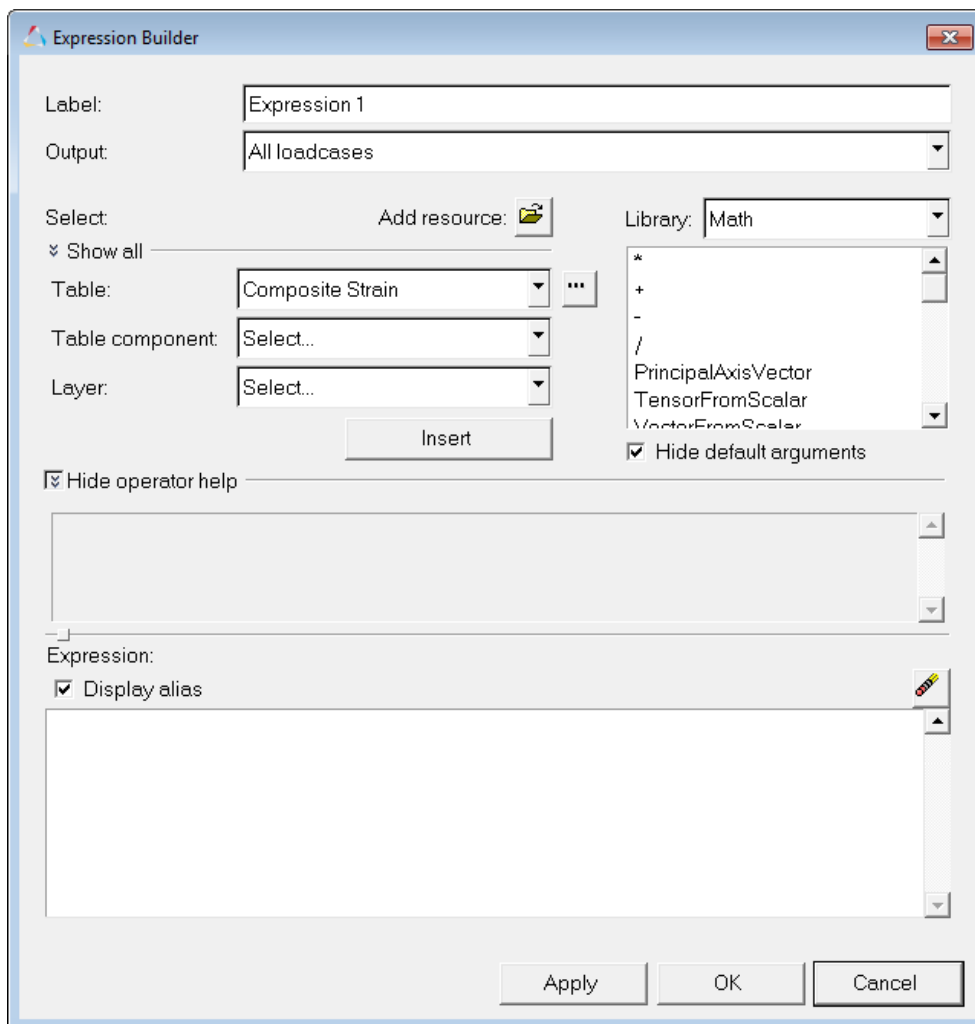
In this tutorial, you will learn how to:

- Create and contour a new scalar result
- Create and contour a new tensor result type
- Create a new result type which is locked to a particular Load Case

### Tools

To access the Derived Results Expression Builder:

- Click the **Derived Results** button on the **Results** toolbar .
- OR
- From the **Results Browser** right click and select **Create > Derived Results**.



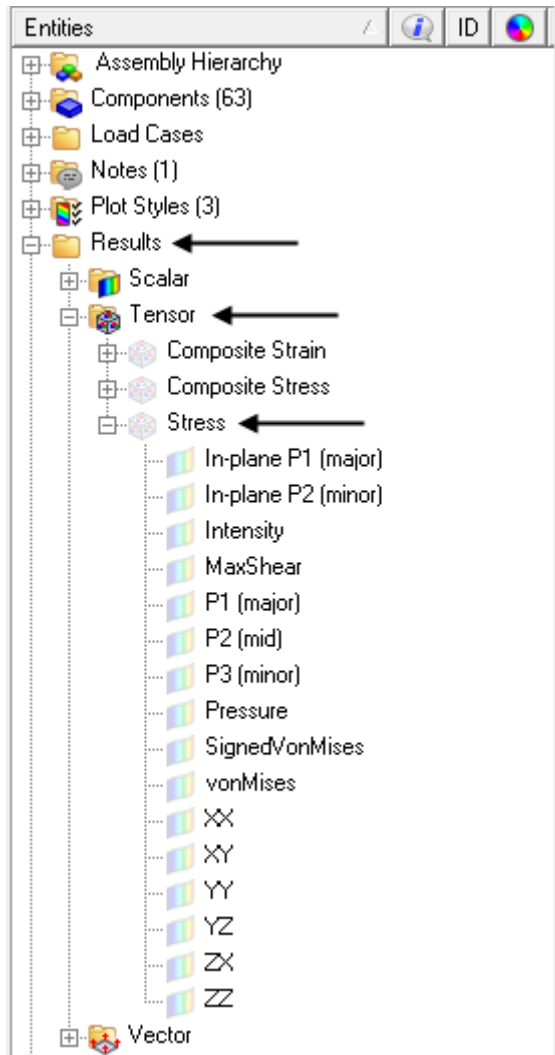
The **Derived Results Expression Builder** allows you to perform math operations on the scalar and tensor results types that are available in the result file.

## Exercise: Creating Derived Results

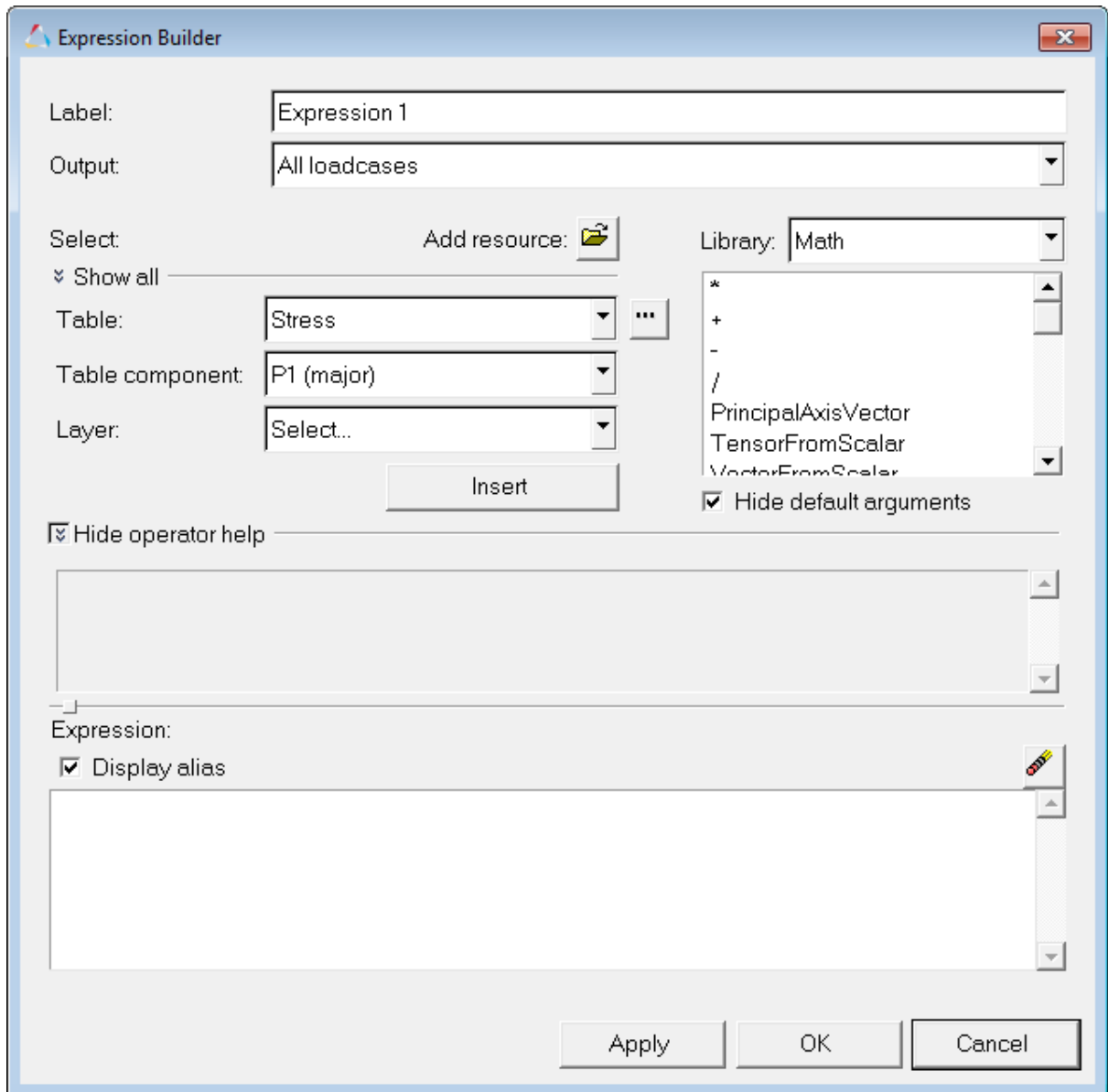
This exercise uses the `cwing.xml` file as both the model and the results file.

### Step 1: Create a scalar Derived Result.


1. Load the `cwing.xml` file, located in the `animation` folder.
2. In the **Results Browser**, expand the folders for **Results**, **Tensor**, and then **Stress**.



3. Right click on **P1 (major)** and select **Create > Derived Result**.



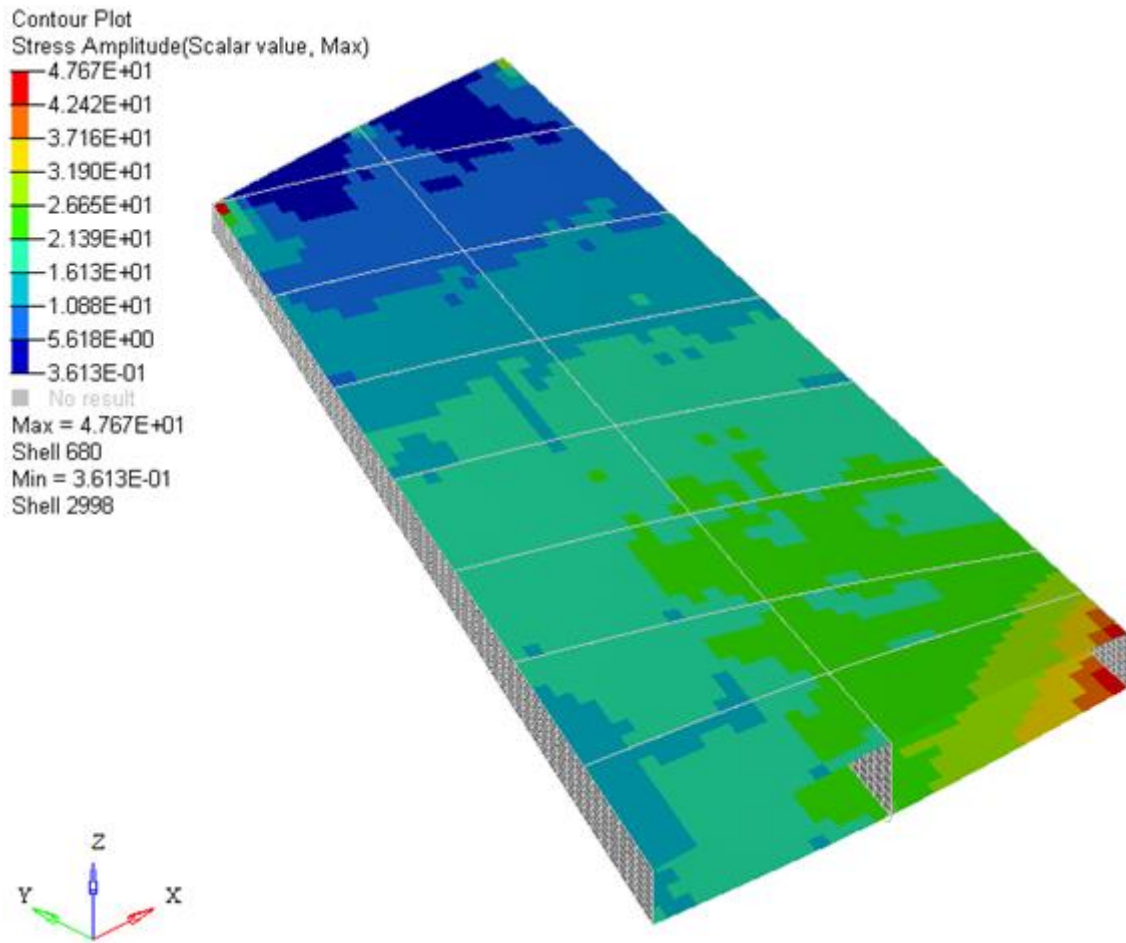
Notice that in the **Table** and **Table component** fields, **Stress** and **P1 (major)** are already selected. This is because **Derived Result** was selected from a result in the **Result Browser**. If a result was not selected, or if the **Derived Result**

**Expression Builder** was launched from the icon on the toolbar , the first result listed in the result file would be loaded.

4. Enter `Stress Amplitude` for the **Label**.



- Next to **Stress Amplitude**, click the contour icon to apply a contour to the model in the graphics window with the new result:



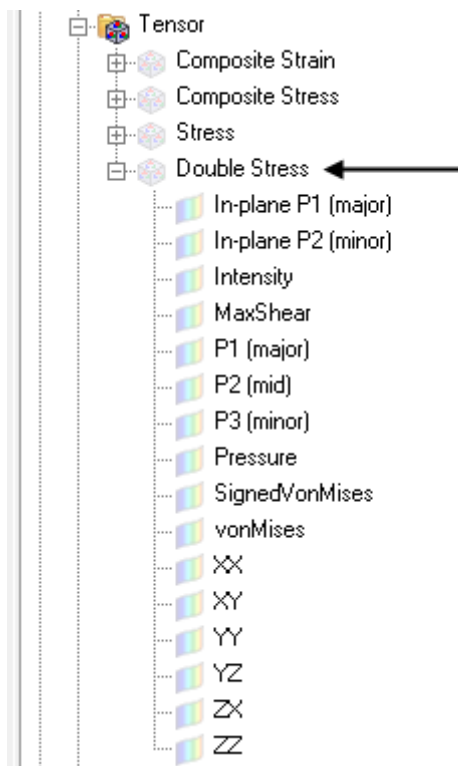
## Step 2: Create a tensor Derived Result.

- In the **Results Browser**, right click in the white area and select **Create > Derived Result**.
- In the **Expression Builder** enter `Double Stress` for the **Label**.
- For **Table**, select **Stress**.
- Click **Insert** to add **Stress** to the **Expression**.

- In the **Expression** field, type  $*2.0$  so that the expression is as shown below:



- Click **OK**.
- Within the **Results Browser**, expand the folders for **Results** and **Tensor**. Notice that there is now a new **Tensor** called **Double Stress**.
- Expand the folder for **Double Stress**.



HyperView determines if the new result type is a tensor or scalar and then lists the new result in the appropriate folder in the **Results Browser**.

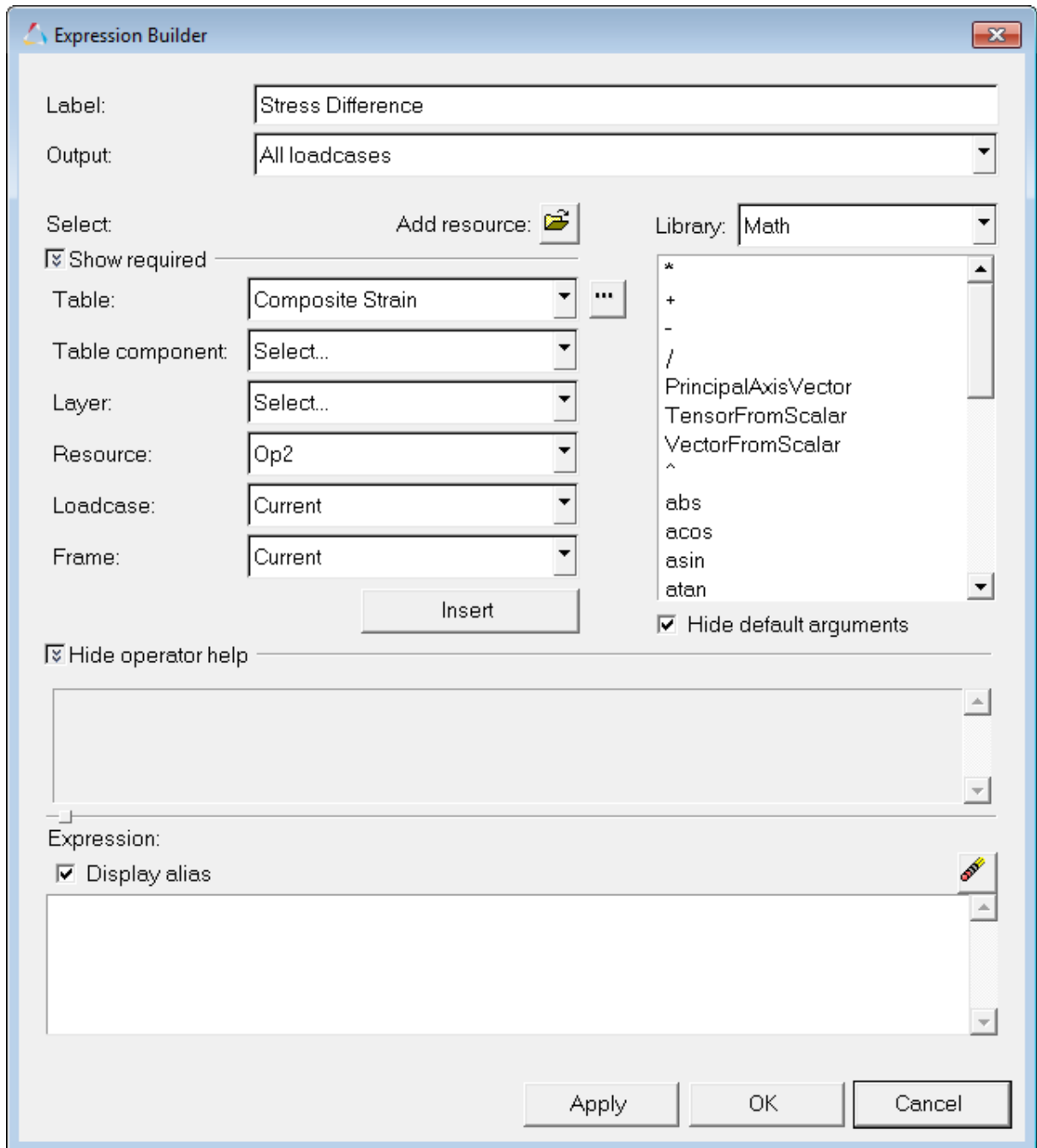
### Step 3: Created a Derived Results for a Specific Load Case.

- In the **Results Browser**, expand the **Scalar** folder and select the icon next to **Stress Amplitude** to create a contour plot.

2. Also in the **Results Browser** change the subcase by clicking on **SUBCASE 1 = Load Case 1: Max Torque**, and selecting **SUBCASE 2 = Load Case 2: Min Torque**.

Notice how the contour changes to reflect the updated subcase.

3. Next we will create a **Derived Result** that references a specific subcase. Right-click in the white area of the **Results Browser** and select **Create > Derived Result**.
4. In the **Expression Builder** enter `Stress Difference` for the **Label**.
5. Under **Select**, click the downwards pointing arrows next to **Show All**.



This shows all the options available for the selected results. This includes specifying a specific **Loadcase** and **Frame**.

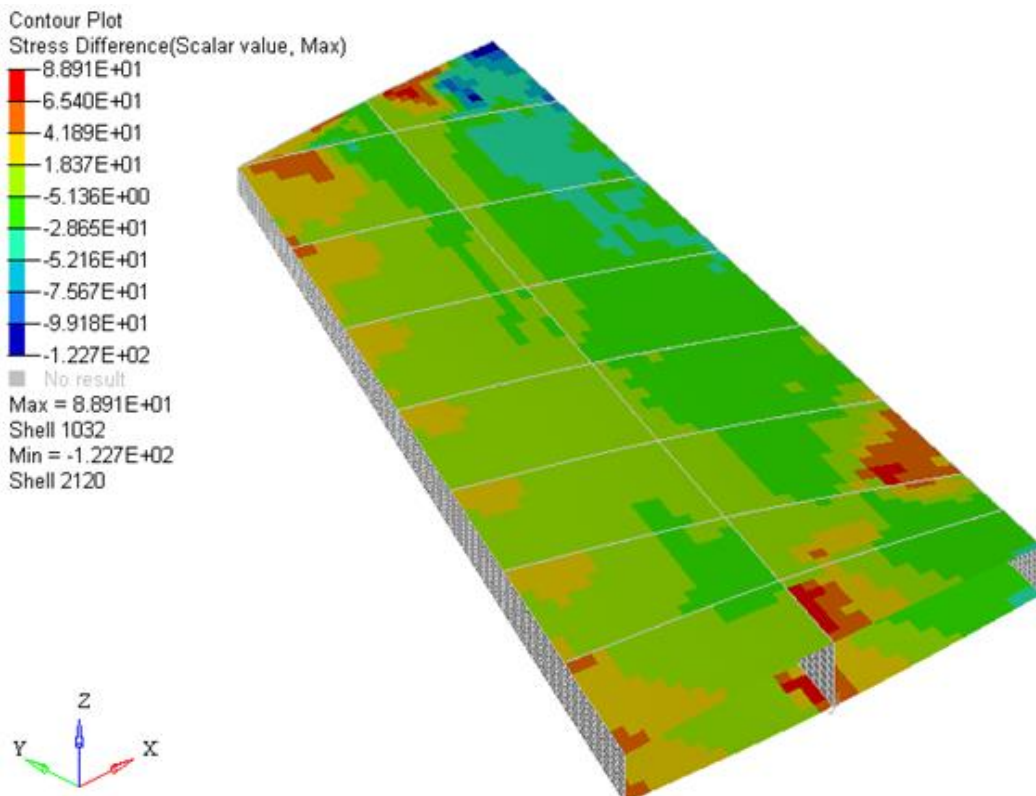


6. For **Table**, select **Stress**.
7. For **Table components**, select **vonMises**.
8. For **Layer** and **Resource** leave the default values.
9. For **Loadcase** and **Frame**, leave the value set to **Current**.
10. Click **Insert** to add the result to the **Expression**.
11. Add a minus sign (-) to the **Expression** after **T3.C10**.
12. Next a specific **Loadcase** will be specified for the vonMises stress value. Update the **Loadcase** field to **SUBCASE 1 = Load Case 1: Max Torque** and then click **Insert**.
13. In the **Expression** field, add  $100 * ($  to the beginning of the expression.
14. At the end of the expression, add  $) / T3.C10$ .

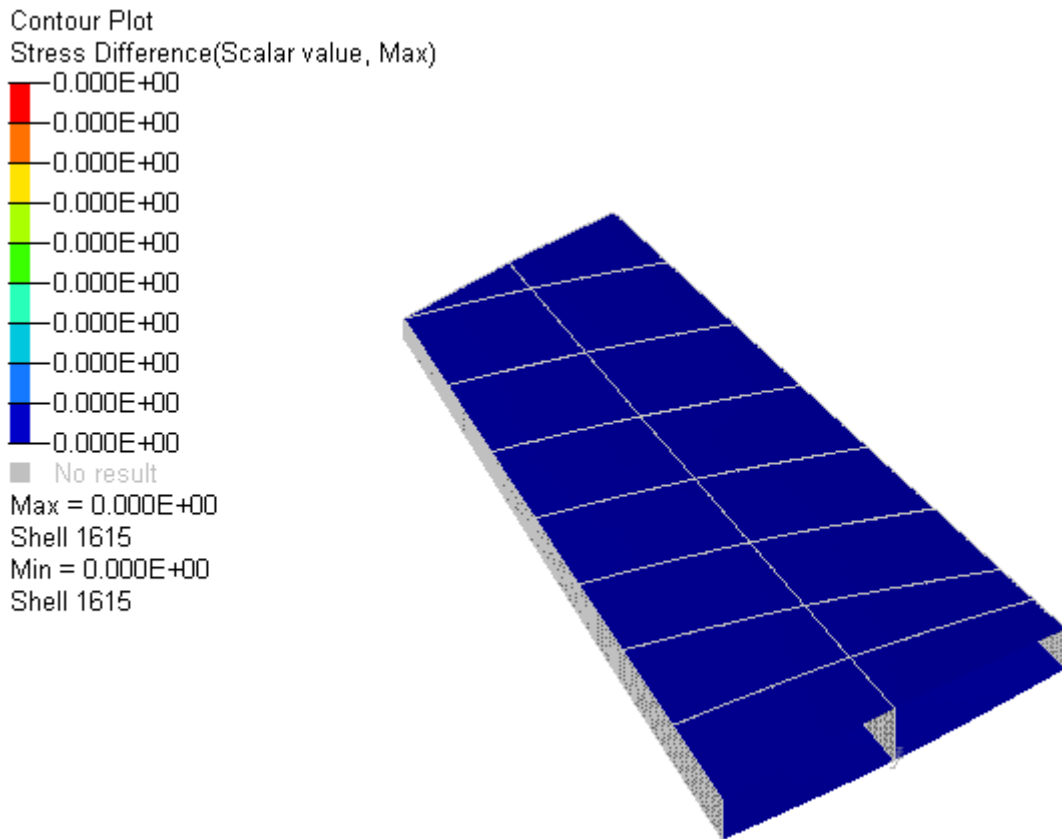
Verify that the expression in the **Expression** field is as shown below:



15. Click **OK**.
16. Using the **Results Browser**, expand the **Scalar** folder and select the icon next to **Stress Difference** to contour the model.



17. Update the subcase to **SUBCASE 1 = Load Case1: Max Torque.**



Notice that all the values are zero. This is because the expression in the **Stress Difference** result subtracts the **vonMises Stress** from **Subcase 1** from the **Current Subcase**, which in this case is also **Subcase 1**.