

Altair HyperView 2019 Tutorials

HV-3099: Creating Derived Results

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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 ¹/₄.
 OR
- From the **Results Browser** right click and select **Create > Derived Results**.

🛆 Expression Builder		۲.
Label: Output:	Expression 1 All loadcases	[
Select: × Show all Table: Table component: Layer:	Add resource:	
I Hide operator help Expression: ▼ Display alias	p	
	Apply OK Cancel	

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**.

🛆 Expression Builder		×
Label: Output:	Expression 1 All loadcases	•
Select: × Show all Table: Table component: Layer: I¥ Hide operator help	Add resource: Library: Math Stress P1 (major) Select Insert Insert Hide default arguments	•
Expression:		
	Apply OK Cance	;

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 $\mathbb{Q}_{\mathbf{x}}$, the first result listed in the result file would be loaded.

4. Enter Stress Amplitude for the Label.



 In the Table field, leave Stress as the selection. Also, for the Table component, leave P1 (major) selected. Click *Insert* to add the P1 (major) stress to the expression.

Expression:	
✓ Display alias	ST.
T3.C7	A
	Y

In the **Expression** field, **T3.C7** is entered. This is the short hand notation that HyperView uses for this result.

- 6. In the **Expression** field, after **T3.C7**, enter a minus sign (-).
- 7. For Table component, select **P3 (minor)** and then click **Insert**.

This adds **T3.C9** to the **Expression** field.

- 8. Update the Expression by adding abs (before T3.C7.
- 9. Finish updating the **Expression** by adding) /2 after **T3.C9** so that the complete expression reads as shown below:

Expression: Display alias	500
abs(T3.C7-T3.C9)/2	<u>_</u>
	-

10. Uncheck the option for **Display alias**.

This displays the **Expression** with the full component names. While it is easy to read in this example, viewing the full component names in the **Expression** can be hard to read when more complicated equations are used.

Expression:		<i></i>
(abs(("Stress.P1 (ma	ijor)"-"Stress.P3 (minor)"))/"2.00	0000000000")
		*

- 11. Check the option for **Display alias** and then click **OK**.
- 12. Within the **Results Browser**, expand the folders for **Results** and **Scalar**.



13. 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.

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



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



- 6. Click **OK**.
- Within the Results Browser, expand the folders for Results and Tensor. Notice that there is now a new Tensor called Double Stress.
- 8. 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.

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



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**.

🛆 Expression Builder		×
Label:	Stress Difference	_
Output:	All loadcases	-
oupu.		
Select:	Add resource: 🛎 Library: Math	•
Show required —	*	-
Table:	Composite Strain +	
Table component:	Select Y	
Layer:	Select PrincipalAxisVector TensorFromScalar	
Resource:	Op2 VectorFromScalar	
Loadcase:	Current abs	
Frame:	Current acos	
	linsert latan	•
I⊠ Hide operator helr	Hide default arguments	
	J	. 1
		<u> </u>
		_
		<u> </u>
Expression:		55
Ir Dispiay alias	• 	
		–
	Apply OK Cancel	

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:

Expression:	
✓ Display alias	511
100*(T3.C10-LC1.T3.C10)/T3.C10	
	-

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







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**.

