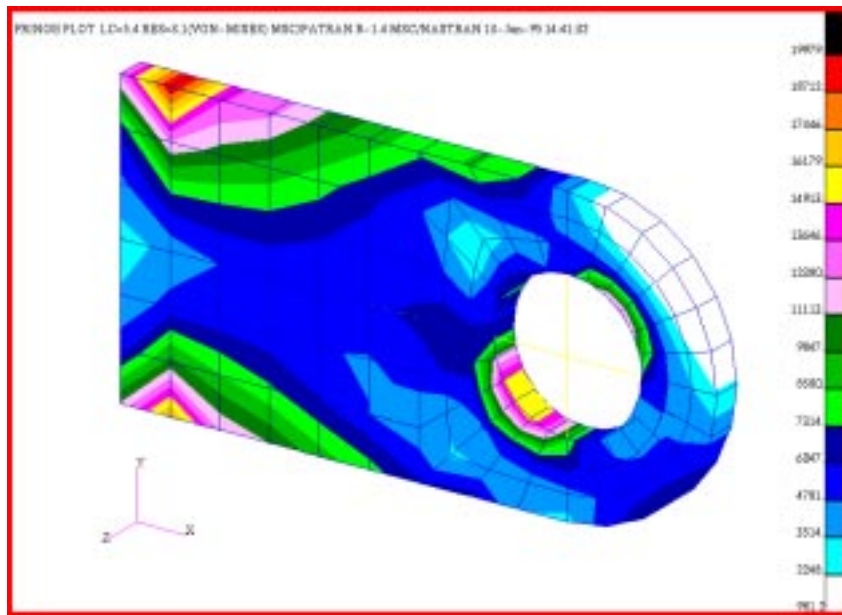# LESSON 17

Post Processing of Results

Objectives:

■ Combine result cases.

■ Use fringe plot options to more accurately look at stress fringe plots.

■ Use xy plots to examine stresses at specific sections.

■ Perform Insight post processing.

Model Description:

In this exercise you will read in model and results from a MSC/NASTRAN output file into a new p3 database. This model is a clevis with two sinusoidal loadings along the pin attachment, one in the transverse direction and one in the axial direction. The first procedure will be to combine the results files to come up with a 25 times load in the axial and a 50 times load in the transverse directions. Next, you will use Results to perform a series of fringe plots on the model. We will be exercising some of the fringe plot options as well as sorting results between various cases. You will also use Results, Text Report to obtain the maximum stresses. After this step, you will use geometry to construct a few lines and look at the stress variation along those lines using XY Plots. Finally, you will use Insight to obtain values at specific nodes and write those values out to a file.
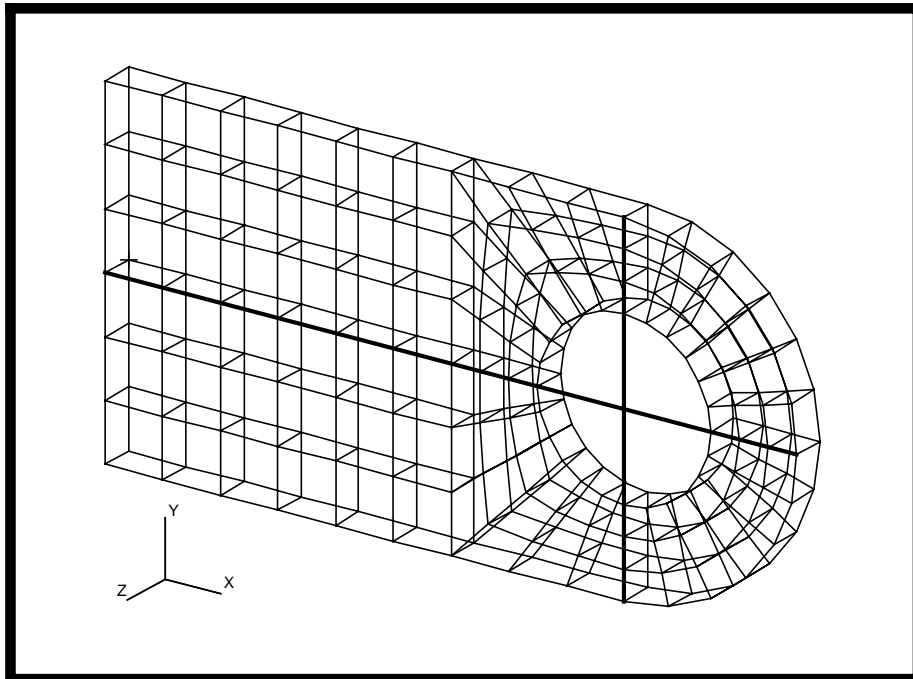
Suggested Exercise Steps:

- ■ Open up a new database called **lug.db** with a maximum model dimensions of 10 units and MSC/NASTRAN as the analysis code.

- ■ Read in both the model and results and select the file **lug.op2** to translate.

- ■ Create two lines, one horizontal and one vertical, to bisect the hole of the model.

- ■ Derive a maximum result between the Axial and Transverse result cases.

- ■ Make a text report of the stress tensors for the new maximum derived result cases.

- ■ Make a Von Mises fringe plot of the Axial result case from Stress Tensor results.

- ■ Repeat the above step for the Transverse and Derive load cases.

- ■ Combine all the results of the axial and transverse load case with the following factors: 25 x Axial + 50 x Transverse.

- ■ Use the combined Result Case and select Stress Tensor to make a scalar fringe plot of the Von Mises Stresses.

- ■ Make a fringe plot using "Individual" Averaging Domain.

- ■ Make a fringe plot using Constant Extrapolation Method.

- ■ Create a XYplot on stress tensor along curve 1.

- ■ Create another XYplot on stress tensor along curve 2.

- ■ Change Insight preferences.

- ■ Using the Insight post-processor to create a Cursor tool.

Files:

All the files used in this exercise are listed below. Each listing includes the file, where it originated, its format (text/binary) and summary information as to how it relates to this exercise.

File	Supplied/Created	Format	Description
ex10.op2	Supplied	text	MSC/NASTRAN results output file that is in ascii format. This file contains the model and results data used in this exercise and originated from a NASTRAN solution 101 run.
ex10.op2.bin	Created	binary	This file is created when ex10.op2 file is read into the PATRAN database. This is a binary representation of the op2 file.
lug.db	Created	binary	This is a PATRAN database (binary) created for this exercise. The model and the results files, ex7.op2, are read into this database and post processed.
lug.msg.01	Created	text	This file is created whenever information is read in or written out from the PATRAN database.
patran.prt	Created	text	This is a PATRAN text report file created using the results of this exercise. This file contains user specified results data and is in ASCII format.
patran.rep	Created	text	This is a report file created using the cursor tool in Insight. This file contains user specified results data and is in ASCII format.

Exercise Procedure:

1.   Create a new database called **lug.db.**

File/New ...

New Database Name: **lug**

OK

In the *New Model Preference* form set the following:

Tolerance: ◆ **Based on Model**

Approx. Max. Model Dimension: **10**

Analysis Code: **MSC/NASTRAN**

Analysis Type: **Structural**

OK

Import Results and Model

2.   Import the model and results by reading in an **.op2** file.

◆ **Analysis**

Action: **Read Output2**

Object: **Both**

Method: **Translate**

Select Results File...

Selected Results File   **ex17.op2**

OK

| Apply |
|---|

At this time, you are asked if you want to wait for the translation process to appear. Click **Yes**. The viewport will disappear while the translation process is in progress. When translation is finished, the viewport will reappear and the model should appear in your viewport.
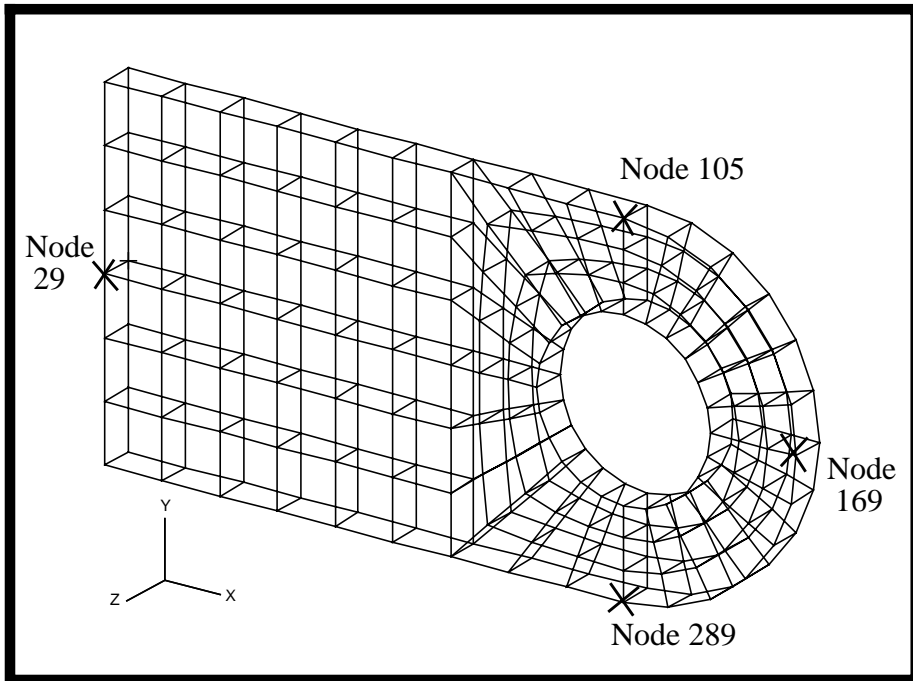
All Labels Off and Named View Option

3.   Turn off all the labels using the **Hide All Entity Labels** icon and use the **Iso 1 View** icon to change the model to an isometric display.
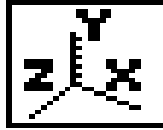
Iso 1 View

4.   Create two curves, one that cuts the model horizontally in half and one vertical that goes through the center of the circle.

Create Curves

Node 105

Node 29

Node 169

Node 289

◆ **Geometry**

Action:	**Create**
Object:	**Curve**
Method:	**Point**

Option:	**2 Point**
Starting Point List:	**Node 29**
Ending Point List:	**Node 169**

Apply

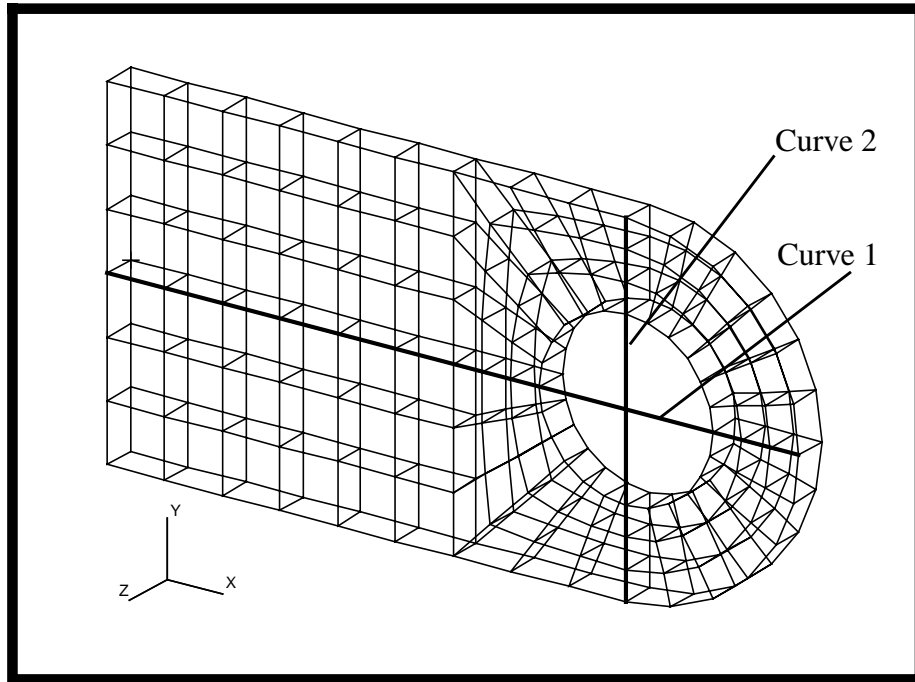| *Starting Point List:*	**Node 105**
Ending Point List:	**Node 289**

Apply

The model should now look like the one shown below.

5. In the *Results* form derive stress tensors from the Axial and Transverse stress tensor results.

Derive a New Stress Tensor

◆ **Results**

Action:	**Create**
Object:	**Results**
Method:	**Maximum**
Select Result Cases	**AXIAL_LOAD...** **TRANSVERSE_LOAD...**
New Results Case Name	**Derived Results**
New Subcase Name	**Subcase 3**
Selected Results	**Stress Tensor,**

Apply

Use this new result case to make a text report of the stress tensors.

Make sure you are on the **Select Results** form

Action:	**Create**
Object:	**Report**
Method:	**Overwrite File**
Select Result Cases	**Derived, Sub Case 3**
Select Result	**Stress Tensor,**

Go to the **Display Attributes** form

Sorting Options...

Sorting Method	◆ **Descending**
Sort By	◆ **Absolute Value**

OK

Apply

A new file will be created in your directory and it is called **patran.prt**.

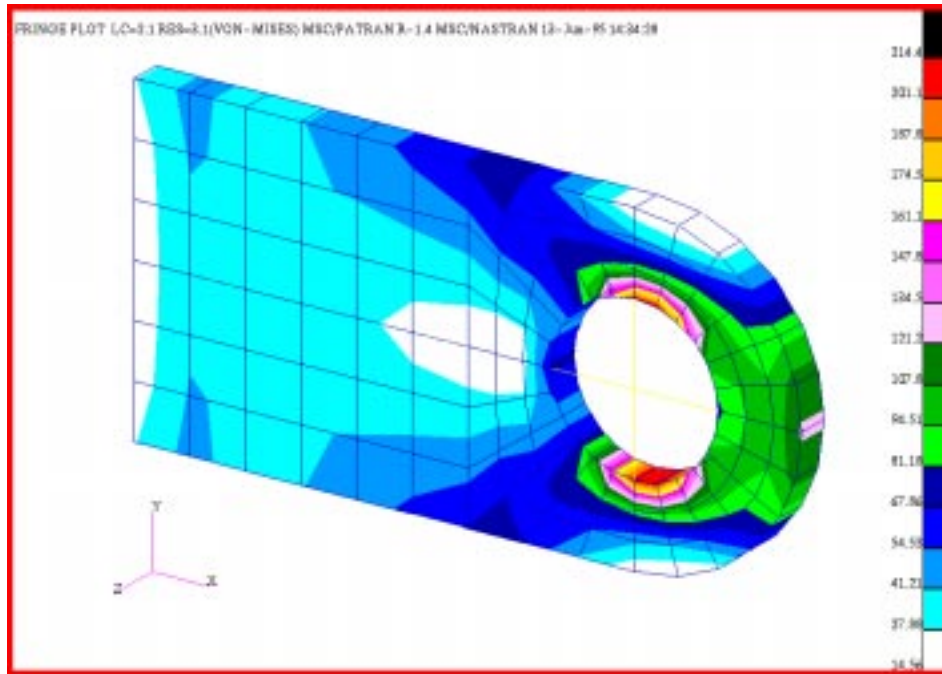6.   Now we will create fringe plots of the stress tensors using the three different result cases.

Action:	**Create**
Object:	**Fringe**
Select Result Cases	**2.1-AXIAL_LOAD...**
Select Result	**Stress Tensor,**

Quantity: **Von Mises**

Apply

The display of the result is shown below.

Post Processing of Results
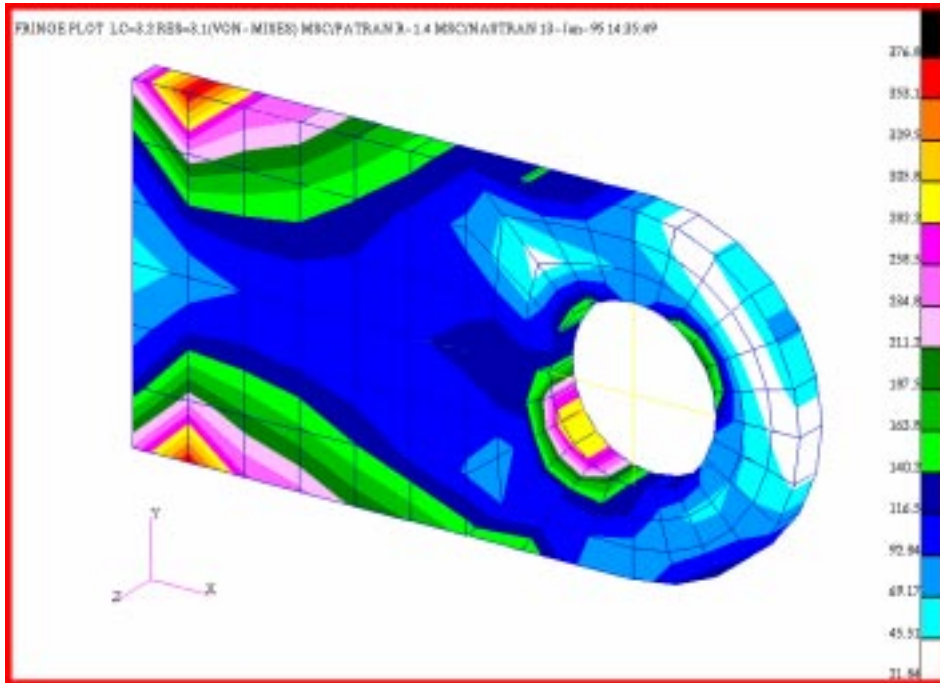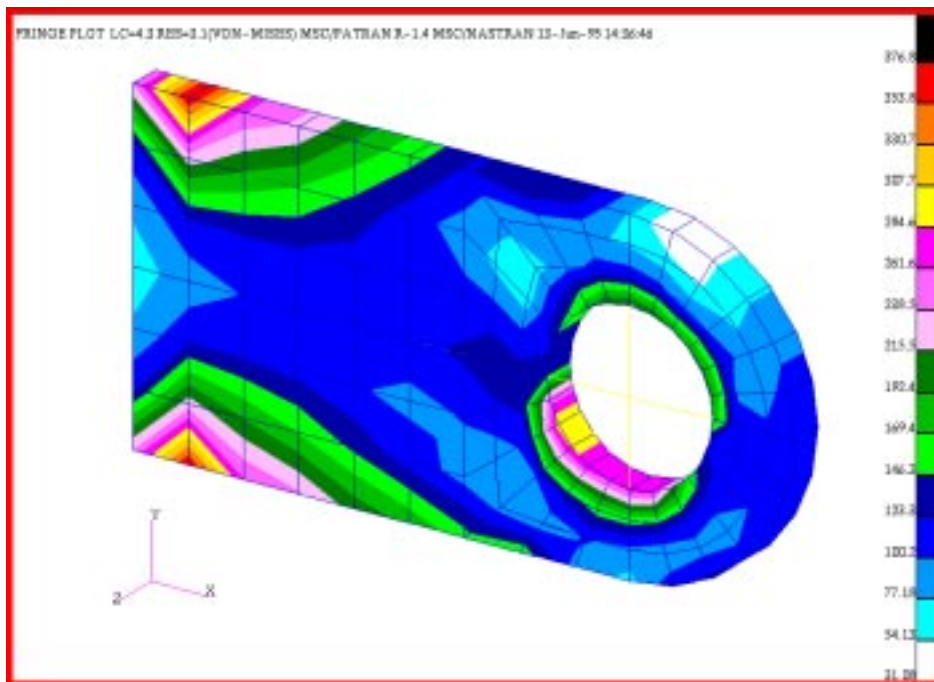
Repeat this step with the Transverse and Derived Load Cases. The displays are shown below.

Transverse Load Case:

Derived Load Case:

**Create a New
Load Case/
Combine
Option**

7. Combine all the results of the axial and transverse load
    cases into a new load case. Use the factors: 25 times
    axial + 50 times transverse.

Action: | **Create** |

Object: | **Results** |

Method: | **Combine** |

Select Result Cases | **AXIAL_LOAD...** |
                                | **TRANSVERSE_LOAD...** |

New Results Case Name | **Combine** |

New Subcase Name | **Subcase 4** |

Click in the factor databox and input the appropriate scale factor

Input Scale Factor (Axial) | **25** |

Input Scale Factor (Trans) | **50** |

Select Results | **Constraint Forces**
                                | **Displacements**
                                | **Stress Tensor** |

| **OK** |

| **Apply** |

In the *Select Result Cases* listbox now is listed the fourth
Load Case that is a combined load case. Pick this load
case and make a fringe plot of the stress tensor using the
same procedures above.

The result fringe plot is as follows:
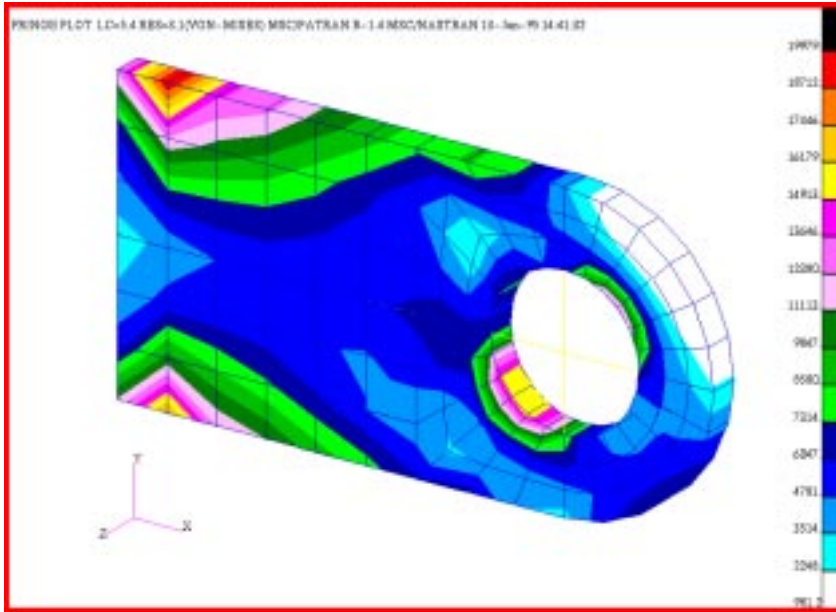
8. Change the fringe plot using **Plot Type Options**.

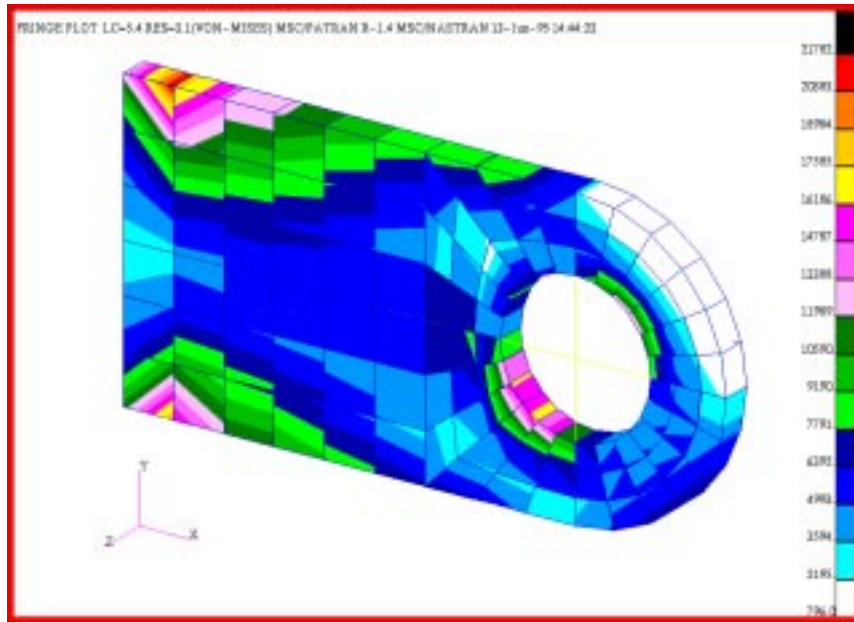First change the *Averaging Domain* from **All Entities** to **None**.

Averaging Definition

Domain:

None

Apply

The view of the fringe plot is now similar to this:

Next, change the *Extrapolation Method* from **Shape Fn.** to **Average** and replot the fringe plot.
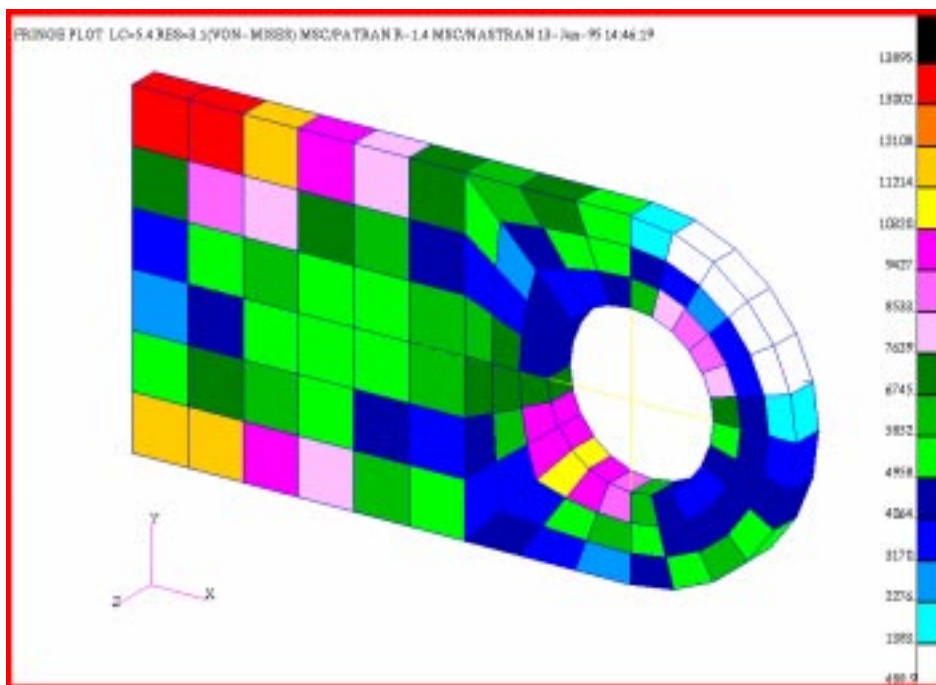
Extrapolation Method   **Average**

Apply

Cancel

The fringe plot should now look like this:

When you are done, reset the options back to its original settings. Clean up the graphics using the broom icon on the upper right hand corner of the top menu.

9. Using the combined result case, create an XY plot of the stress tensor along arbitrary paths. Use **Curve 1** and **Curve 2** as the arbitrary paths.

Create an XY Plot

Action:	**Create**
Object:	**Graph**
Method:	**X vs Y**
Select Results Case	**Combine, Subcase4**
Y:	**Result**
Quantity:	**Magnitude**
X:	**Path Length**

Select the path by clicking on the **Target Entity** icon

Addtl. Display Control	**Curves**
Select Path Curves	**Curve 1**
Points Per Segment	**20**

Apply

Repeat the procedure above with **Curve 2** as the *Selected Path*

XY plot of the stress tensor along arbitrary paths.
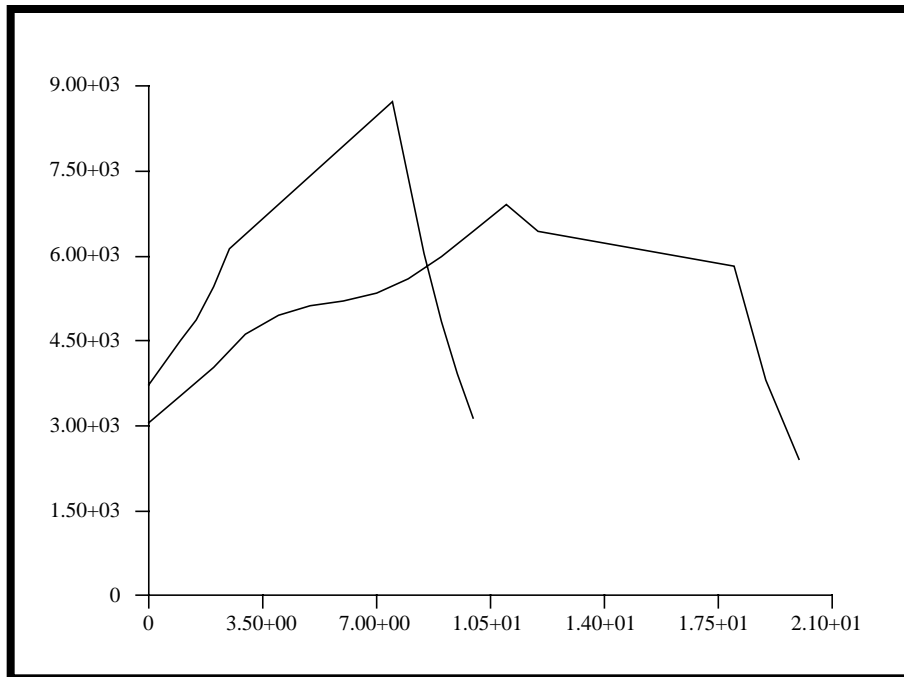
10. Using the **Insight** post-processor, create a **Cursor** tool. Upon selecting the **Insight** button, the viewport will disappear and after several seconds a new Insight viewport will appear.

Create a Cursor Tool in Insight

◆ **Insight**

Change the display method using *Preferences* first.

| Preferences/Insight... |

Display Method   **Wireframe**

Edge Color   **Gray**

Apply

Cancel

Now go back to the *Insight* form and create a **Cursor** tool.

Action: **Create**

Tool: **Cursor**

Results Selection

Current Load Case(s)	**5.4-Combined, Sub Case 4**

Update Results

Cursor Result	**3.1-Stress Tensor,**

Tensor To Scalar	**Von Mises**

Element Result Mapping   ◆ **Nodal Average**

OK

OK

To complete the task, push the **Cursor Attribute** button.

Cursor Attributes

Color	**White**

■ **Display Values On Form**

OK

Apply

■ **Cascade Spread Sheet**

ID List	

Under the databox, there are two blank rows with headings **ID** and **Value 1**. These rows are part of the spread sheet. Click in the databox and using the pointer arrow pick several nodes in the viewport by clicking directly on the screen. You will see values appearing next to the nodes that are picked. The node ID and its corresponding value will appear also on the spread sheet.

To print out the spread sheet into a file, click on the **Output to File** button.

Output to File...

Cursor Results File Name	**patran.rep**

Apply

Cancel

The file **patran.rep** will be written onto your directory.

11. Close the database and quit p3 to complete the exercise.

File/Quit