ANSYS - Plate with a Hole - Problem Set 1

Problem Specification
1. Start-up and preliminary set-up
2. Specify element type and constants
3. Specify material properties
4. Specify geometry
5. Mesh geometry
6. Specify boundary conditions
7. Solve
8. Postprocess the results
9. Validate the results
Problem Set 1

Problem Set 1

Problem Statement

We used a 4-node quad element (PLANE42) in the tutorial. ANSYS also offers a 8-node quad element (PLANE82). Re-solve the tutorial problem using the PLANE82 element. Compare plots of the nodal and element solution of the von Mises stress for the two cases. You may use either mesh for this problem (although the final results presented here are done using the coarser mesh).

Hints

Look at the steps and think about which ones you have to change.

When you remesh the object, notice the following changes:

```
** Meshing of area 3 in progress **
   ** AREA     3 MESHED WITH   105 QUADRILATERALS,      0 TRIANGLES **
** Meshing of area 3 completed ** 105 elements.

NUMBER OF AREAS MESHED     =        1
MAXIMUM NODE NUMBER        =      364
MAXIMUM ELEMENT NUMBER     =      105

PRODUCE ELEMENT PLOT IN DSYS =   0
```

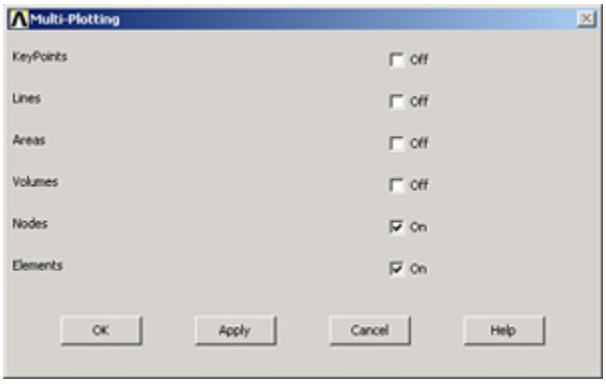
Higher Resolution Image

The number of nodes has increased!

To see why, do:

Utility Menu > PlotCtrls > Multi-plot Ctrls ...

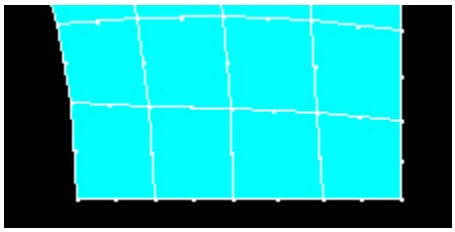
Click ***OK***. Then on the *Multi-Plotting Window* that comes up, deselect everything but ***Nodes*** and ***Elements***.



Click ***OK***.

Then go to ***Plot > Multi-Plots***

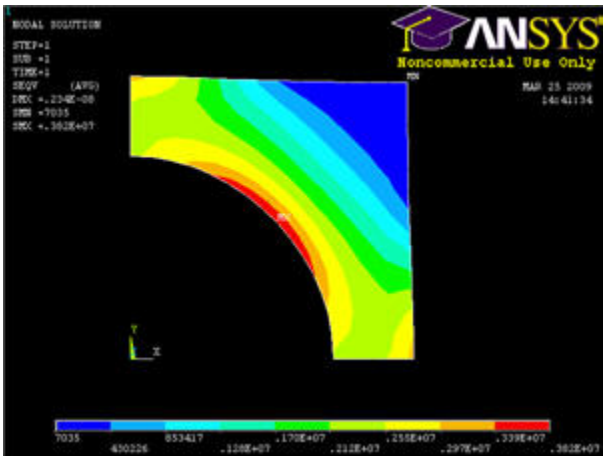
In the *Graphics Window*, you will now see the nodes in between the lines. There are 8 points for each quadrilateral area instead of the four we had before!



Final Result

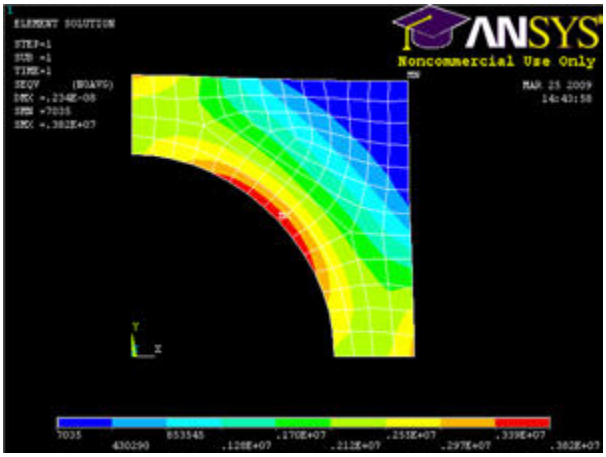
Here are the Nodal and Element Solutions you should have gotten:

Nodal Solution



Higher Resolution Image

Element Solution



Higher Resolution Image

Back to Problem Specification

See and rate the complete Learning Module

Go to all ANSYS Learning Modules