Postprocessing

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1. Introduction

The finite element analysis involves the following three steps.

- *Preprocessing*: In this step, the data required is geometry, material properties, loads and boundary conditions. In this step a mesh for a given problem/model is generated and type of the element required, density of the mesh is selected.

- *Numerical Analysis*: Here type of analysis is decided i.e. static analysis, dynamic analysis, modal analysis etc. Depending on the requirements analysis can be linear analysis or nonlinear analysis. Once the analysis is decided, the finite element matrices are generated and from these matrices large matrix equations are generated. These matrix equations are solved for field values at the nodes.

- *Postprocessing*: Once the finite element matrix equations are solved for field values at the nodes, in this step these derived quantities are graphically displayed. To know the variation of the filed variable along the model/mesh contour plots of the field are plotted.

2. Contour Plots

Contour plots are the plots of a field which are zones of colors. Different color levels are used for the different values of the field. These contour plots are plotted in postprocessing step to know how the field varies along the model.

3. About the present Code

The present code is useful for postprocessing of 2D and 3D finite element analysis. After finite element analysis is done for the nodal field values, the present code can be used to plot the contour plots. The contour plots can be plotted on the mesh and also on the deformed mesh. The input required are the field values along with the nodal coordinates and the node numbers connecting the elements.

As an example, the contour plots are plotted for some finite element analysis of a cylindrical thin shell. Cylinder is clamped rigid at the bottom, and bottom plate is not meshed. The displacement field is given and the components of displacements are plotted on the mesh. Using the code, contour plots of stress components can also be plotted.

The following figures show the contour plots of cylindrical shell.

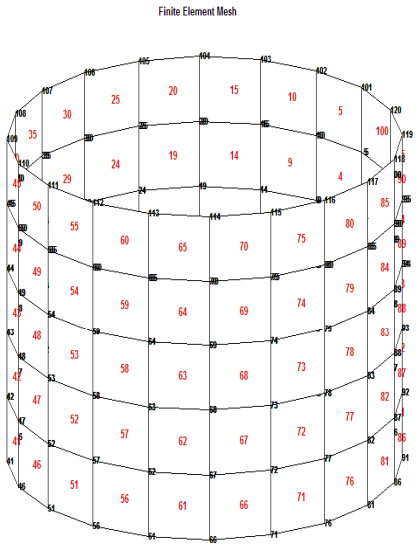

Figure 1: Mesh of cylinder

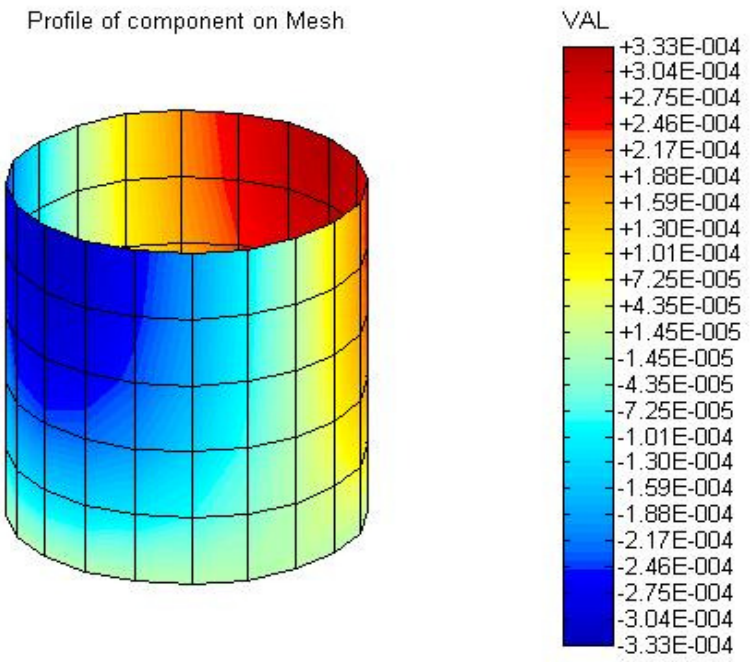

Figure 2: UZ field profile on the cylinder

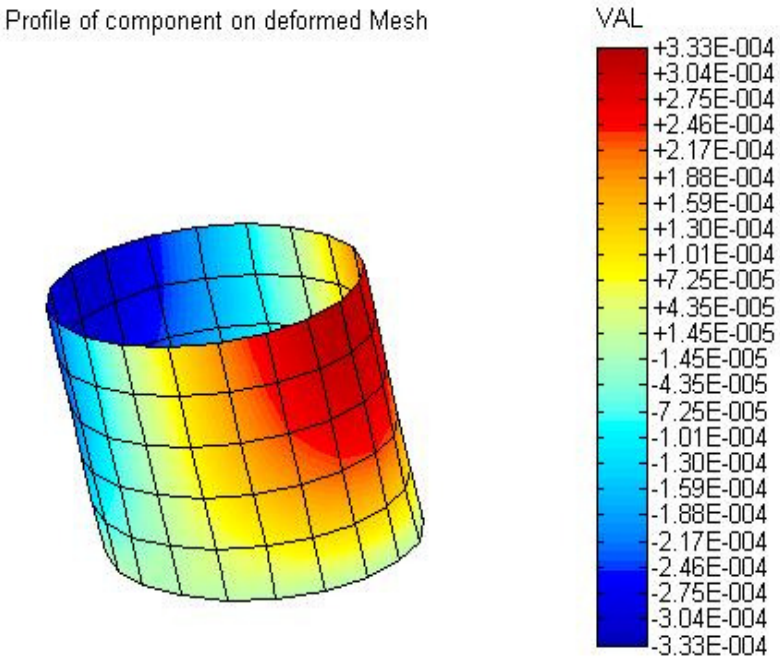

Figure 3: UZ field profile on the deformed