

Lab 7: 03/10/04
3D versus 2D

1. Solve the simple example given on the blackboard iteratively.
2. Consider the steel plate shown in figure 1 below. The length, width, thickness and diameter of the hole are $\ell = 0.5m$, $w = \ell/4$, $t = \ell/20$ and $d = w/2$ respectively. Modell the plate as a 3D problem in femlab. The plate is clamped at the left end.

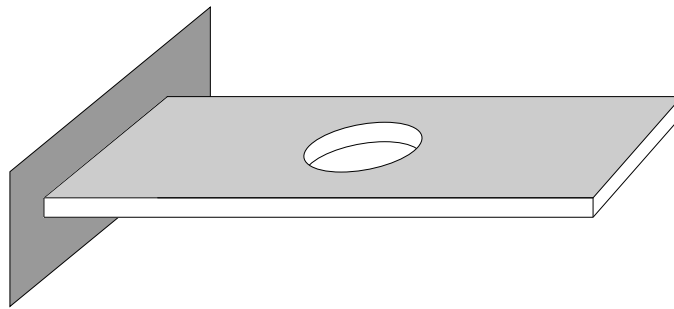


Figure 1: Plate with hole

3. First let us apply a tensile stress of $\sigma = 10\text{MPa}$ at the right end. Solve the problem and study the different plot options. Make a plot of the von Mises stress on the deformed body and write down the maximum value. Also plot the stress and strain in the thickness direction.
4. Repeat the third point for an applied in plane shear stress of $\tau = 1\text{MPa}$.
5. Now model the plate as a 2D plane stress problem. Solve the same two load cases as before and compare your results.