

MECH151 Spring 2010  
Homework #4 due May 4

1. Download `holy_beam.m` which is a cantilever beam with holes in it, modelled with `tria` elements. You will also need `tria_k.m` and `svm_node.m` and the Mesh2D meshing package, which is available as a zip file.

The beam is fixed along the left edge and loaded vertically on the right edge. Run it as is and you should get nice results, with red indicating highly stresses regions. The weight appears in the title of the first plot.

Then see if you can improve the design by reducing its weight while keeping the maximum von Mises stress under 22 ksi. You may change any of these:

- Number of holes, their locations and sizes (line 28).
- Width of the base (line 6).
- Width of the tip (line 7).
- Max element size (line 13).

Do not change

- Length of the beam
- Load
- Material properties
- Thickness

Have fun!