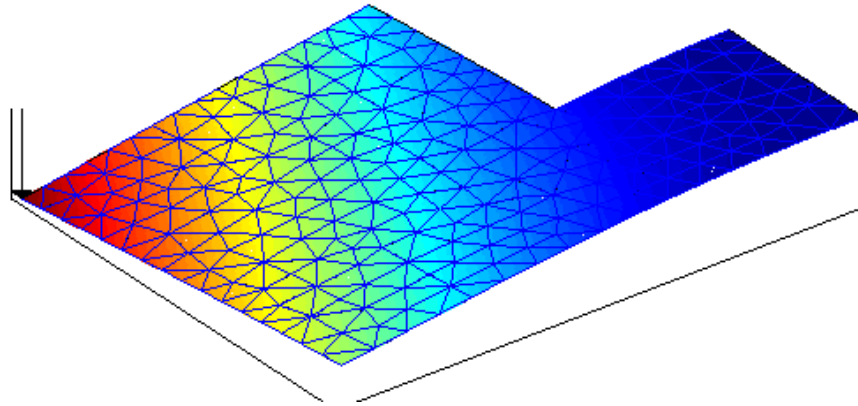


MECH151 Spring 2010
Homework #5 due May 11

1. Download `pltest.m` which is a cantilever plate with a concentrated load on one corner. The `quad4` element also handles plate bending triangles, which is what `mesh2d` generates. If we had a good quad mesh generator we would use that instead. Also download the plate bending package `plbend.zip` and unzip it. Run `pltest.m` as is and you should see the following:

Weight 3.625 lb, displacement under load 0.238 in



The colors represent lateral displacement, not stresses. I can't find code to recover stresses in these elements.

Your design goal is to minimize weight while keeping the corner displacement below 0.25 in. max. Things you may change:

- Move corners 1, 4, 5
- Add holes

Things you may not change:

- Locations of corners 2 and 3 (supported edge)
- Location of corner 6 (loaded corner)
- Material properties (Al)
- Thickness

- Amount of load
 - Mesh size (a coarser mesh will lead to erroneously high stiffness, which would be cheating).
2. Download `holy_plate.m`. Run it as is and note the lateral displacement under the load. Reduce the mesh size at least twice and note what happens to the mesh size. Tabulate (or plot if you like) mesh size, number of free DOF and displacement under load. The point is to show convergence. **Warning:** if you make the mesh size too small you will likely run out of memory or exceed some other limit.

Mesh size 3.0, 605 free DOF, displ. under load 0.331 in

