ME 478 Homework #4 Due: May 1st, 2013 before class.

Please show your work and draw a box around your answer to receive full credit.

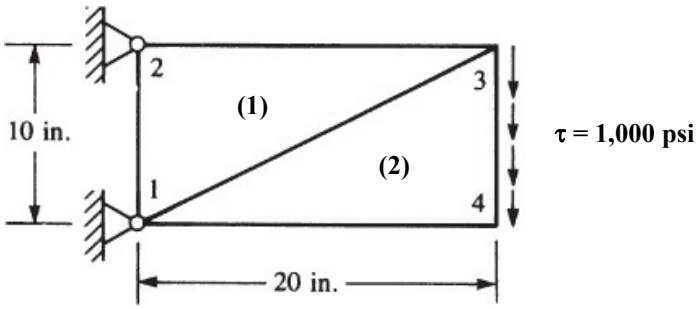

Figure 1. Steel plate with end-load and discretized by 2 elements.

A steel plate that is 20 inches long, 10 inches tall, and t = 1 inch thick with elastic modulus E = 30×10^6 psi and Poisson's ratio $\nu = 0.3$ is loaded on its end by a shear stress of 1000 psi (Fig. 1).

1. Determine the deflection of each node and the reaction loads at nodes 1 and 2 using Minimum Total Potential Energy Formation. Use Matlab to solve and submit your DIARY file along with your hand-written work for the problem.

2. What is the analytical solution for the end-displacement if the steel plate is assumed to behave like a cantilever beam? Does the displacement you found analytically agree with the displacements you found with FEA in part 1? Explain why there is agreement or no agreement between the two approaches.