ME 478 Homework #5

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

1. A steel plate that is 20 inches long, 10 inches tall, and t = 1 inch thick with elastic modulus $E = 30 \times 10^6$ psi and Poisson's ratio $\nu = 0.3$ is loaded on its end by a shear stress of 1000 psi (Fig. 1). Determine the deflection of each node. Use Matlab to solve and submit your DIARY file along with your hand-written work for the problem.

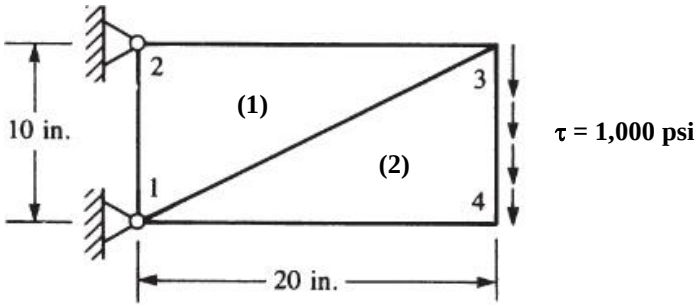

Figure 1. Steel plate with end-load and discretized by 2 elements.

2) Use MATLAB and write an M-file to evaluate the deformation for a mound of clay spinning on a potter's wheel at 20 rpm. A 1-element representation of the system is shown in Figure 2. Let $E = 3 \times 10^3$ psi, $\nu = 0.45$, and $\rho = 0.08$ lbf/in^3 for clay. For boundary conditions, assume radial displacements along the axis of symmetry (u_{1r} and u_{3r}) and vertical displacements at the potter's wheel (u_{1z} and u_{2z}) are zero.

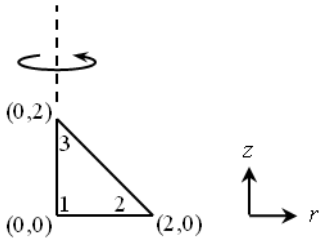

Figure 2.