ME 712, Finite Element Method Applications Exam 2, Spring 2005

Open book, closed notes. Test books will be provided.

1. Determine the mass matrix of a 3-noded rod element with the center node equidistant from the ends using Gauss quadrature. Presume constant area and density.

2. Obtain the Jacobian for a quadratic (LST) triangular element assuming nodes at (0,0), (1,0), (0,1), (0.5,0), (0.5,0.5), (0,0.75). Explain any assumptions. Show all work.

3. Find the stress at (x, y)=(0,1) of a bilinear quadrilateral (Q4) element with nodes 1-4 at (0,0), (1,0), (1,2), and (0,1) in terms of u_4 and v_4 (presume all other nodal displacements are zero).