AM 5450

Assignment 3

1. Assume a plate of size 100 mm x 100 mm, with a centrally located hole of diameter 10 mm. The plate is loaded at the external boundaries:
   A. Under uniaxial tension
   B. Under biaxial tension
   C. Under tension in one direction and compression in another

   Find the stresses in the vicinity of the hole using triangular element and determine the stress concentration factor each case.

   Assumptions: Plane stress problem

   (Plane stress formulation is available in Asghar Bhatti and the definition of stress concentration can be easily googled.)

2. Consider a propped cantilever beam of length 300 mm with a rectangular cross section of size 50 mm x 50 mm. The extra support is provided at 150 mm. The beam is subjected to a uniformly distributed load 10 N/m (downward) and a tip load of 2.5 N (upward). Solve the question considering iso-parametric rectangular element (4 noded and 8 noded) . Plot:

   a. U vs y
   b. V vs x

   Compare the results against the Timoshenko and Euler Bernoulli beam theory which was derived in the previous assignment.

   (Assumption: Plane stress problem)