MEEN 644 – Numerical Heat Transfer and Fluid Flow
Spring 2019
HOMEWORK SET #2

Name _____

Instructor: N. K. Anand

Due Date: February 19, 2019
Maximum Points: 100

Consider a one-dimensional heat conduction in a cylindrical copper (Cu) rod of length of 1.0 m long. The diameter of the rod is 0.05 m. One end of the rod (X = 0 m) is held at 100 °C and the ambient temperature is at 25 °C. Heat is transported from the surface of the rod and the other end of the rod (X=1.0 m) through natural convection to the ambient. The natural convection heat transfer coefficient h=0.5 W/m^2 °C. Write a finite volume code to predict temperature distribution as function of length. Use Tri-Diagonal Matrix Algorithm (TDMA) to solve a set of discretization equations. Make calculations using ITMAX: 6, 11, 21, 41, and 81 nodes. Plot your results.