Computational Fluid Dynamics (AE/ME 339)
MAEEM Dept., UMR, Fall 2001

Home Work Problem 5

A circular steel rod of length L = 30 cm, insulated on the sides, is initially at a temperature of 0^o C. Suddenly the right end is raised to a temperature of 50^o C and maintained at that temperature, while the left end is kept insulated. Use the implicit method discussed in class and calculate the temperature distribution along the length of the rod at following times.

i) 0.05 s
ii) 2 s
iii) 50 s
iv) 100 s

1. Plot your results in non-dimensional form using $\theta = (T-T_o)/(T_1-T_o)$, where T_o is the initial temperature and T_1 is the temperature at the two ends for $t > 0$.

2. Form a table of values of the temperature distribution at different times.
3. Check for grid independence of your solution.