

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

Home Work Problem 5a

A circular steel rod ( $\alpha = 1.474 \times 10^{-5} \text{ m}^2/\text{s}$ ) of length  $L = 30 \text{ cm}$ , insulated on the sides, is initially at a temperature of  $0^\circ \text{ C}$ . Suddenly the right end is raised to a temperature of  $50^\circ \text{ C}$  and maintained at that temperature, while the left end is kept insulated.

In order to numerically solve the non-dimensionalized governing equation using the implicit method, you need to first set up the equations. To understand the problem, you can set up using 5 intervals (6 nodes including the boundaries).

Obtain the set of equations in the tridiagonal form by calculating the numerical values of  $a_i$ ,  $b_i$ ,  $c_i$  and  $d_i$ . Show your results in a table showing  $a$ ,  $b$ ,  $c$ ,  $d$  for all the  $i$  values.