

Computational Fluid Dynamics (AE/ME 339)

Home Work Problem 6a

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° C . Suddenly the right end is raised to a temperature of 50° 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.