

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

Home Work Problem 6

An infinitely long bar of thermal diffusivity α has a square cross section of side $2a$. It is initially at a uniform temperature T_0 and then suddenly has its surface raised to a temperature T_1 and then the surface temperature is held constant at T_1 . Compute the temperature distribution $T(x,y,t)$ inside the bar using the ADI method.

1. Obtain numerical solutions for the following data: $\alpha = 1.3 \times 10^{-5} \text{ m}^2/\text{s}$, $a = 20 \text{ cm}$, $T_0 = 20\text{C}$, $T_1 = 80\text{C}$.
2. Plot the dimensional temperature distribution along a line AB parallel to x axis for which $y = 10 \text{ cm}$, for time $t = 610\text{s}$, 1200 s and 2300 s .
3. Present your results as discussed in class for HW4.

