

CH49019: CAPE Laboratory [AA]

Assignment #2

Date: October 28, 2021

Submission due: October 28, 2021; 09.00 PM (Marks: 100%)

Submission closing (late hand-ins): October 28, 2021; 11.59 PM (Marks: 50%)

Problem statement:

Use Gauss-Seidel method to solve for the temperature distribution of a long, thin rod with a length of 0.50 m at $t = 0.1$ s, 0.2 s, 0.3 s, 0.4 s and 0.5 s by Crank-Nicholson scheme and use the following values: thermal conductivity (k) = 0.50 cal/(s.cm. $^{\circ}$ C), $\Delta x = 10$ cm, and $\Delta t = 0.1$ s. At $t = 0$, the temperature of the rod is zero and the boundary conditions are fixed for all times at $T(l = 0 \text{ cm}) = 500^{\circ}\text{C}$ and $T(l = 50 \text{ cm}) = 50^{\circ}\text{C}$. The rod is made of aluminum having a specific heat capacity (C) = 0.2174 cal/(g. $^{\circ}$ C) and $\rho = 2.7$ g/cm 3 .

IMPORTANT Instructions

- **Before submission, RENAME the file with your Roll No.**
- **ONLY (MATLAB and C/C++) Codes (*.m, *.c, or *.cpp) to be uploaded/submitted through Teams Assignment portal.**
- **Do NOT forget to click on Hand-in button in Teams Assignment submission**