Modeling and Simulation, MC312
Lab-8

November 1, 2023

In this lab, the objective is to model heat diffusion through a thin metal bar that has a constant application of heat and cold at designated locations on the bar. The model is quite general and can be applied to other problems that involve diffusion, such as pollution spread in lakes, diffusion in gases, etc. *For submission see notes below*

1. Read the chapter carefully and implement all the functions in the chapter *i.e.* initialization, application of hot and cold at the boundaries, neighborhood, diffusion algorithm, boundary condition, diffusion simulation, and visualization.
   (a) From the projects section, do projects 1-3.
   (b) **(Extra Credit Question)** Do the stochastic diffusion problem in question 9 under projects.

Note

- The main aim of the lab is to learn how to do rule-based simulations. The heat diffusion problem is simpler since it is based on physical laws.
- Observe the flexibility that is provided by such simulations. Also, note the algorithmic and computational complexity that such models pose.
- There is no need to submit a latex report. Instead, you should have your working code and all the visualizations ready during the viva.