

Department of Mechanical Engineering
Indian Institute of Technology Kanpur
ME685A: Home Assignment 8

Due: on or before October 25, 2021

This assignment must be your own work. Taking help from others or helping others are not allowed.

On March 04, 1978, British Medical Journal reported influenza epidemic in a British boarding school. we wish to use the S-I-R model to analyze the case. Among 763 boarders, initially ($t = 0$) only 1 student was found to be infected. Typical R_0 for such disease is 3.65 and the transmission rate of influenza in such a setting may be taken as 1.66.

1. Write a pseudocode for solving the above problem using S-I-R model
2. Write a computer program in any language without using any built-in ODE-solver libraries. Use step size $h \leq 0.25$ days
3. In one figure, plot S, I, R vs. time
4. Find the maximum value of I and the time duration (from $t = 0$) for the disease to reach 1% of the maximum I (after crossing the maximum).
5. Create a *pdf* document that includes pseudocode, plot, final answer and other relevant information/calculations. Write your name and roll no at the top of each page. Also write your name and roll no in the computer program (duly commented). Put the above *pdf* document and the computer program in a folder. Name the folder as $\langle \text{name} \rangle - \langle \text{roll} \rangle - \langle \text{hw8} \rangle$. Zip the folder and upload in MooKit.

Your program file must be a plain text file. The file extension should be as per your programming language (*.c, *.cpp, *.f90, *.py etc.)