Assignment 7

Math 383L Fall 2022

Due 11/8 (Before Class)

Systemic Epidemic

Solve the SIR problem introduced earlier:

$$\begin{pmatrix} S' \\ I' \\ R' \end{pmatrix} = \begin{pmatrix} -\alpha \frac{SI}{S+I+R} \\ \alpha \frac{SI}{S+I+R} - \beta I \\ \beta I \end{pmatrix}, \quad \begin{pmatrix} S(0) \\ I(0) \\ R(0) \end{pmatrix} = \begin{pmatrix} S_0 \\ I_0 \\ R_0 \end{pmatrix}$$

using your favorite method we've talked about (I would recommend Euler for simplicity) and your own parameters.

This is an open ended question. I want to see three different plots each representing a unique problem (different initial values, and/or parameters). The plots should be used to show a qualitative behavior, trend or scenario. Provide a 3-5 sentence description for each plot to qualitatively describe to me what is happening.

Some references to look at :

https://community.wolfram.com/groups/-/m/t/1920119

https://en.wikipedia.org/wiki/Compartmental models in epidemiology