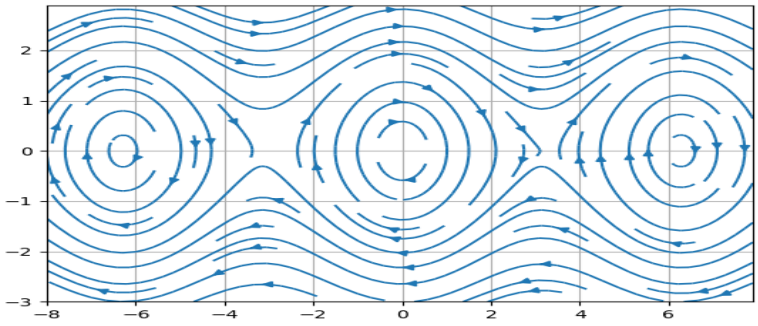
COSC 4320 System Modeling
Programming Assignment 04
Deadline: 04/24/202 at 11:59 PM

Instructions:
Submit your well commented Python code only
Do not submit your code in doc or PDF format. (-2 points will be deducted)

1. (4 points)The motion of a simple pendulum can be expressed as $\frac{d^2\theta}{dt^2} = -\frac{g}{L} sin\theta$. Write a Python script that plots the phase space for the model. If done correctly it should look like this:



Tip: use the sample code for Continuous Time modeling I uploaded as an example

2. (4 points) The SIR model is given as

$\frac{dS}{dt} = -aSI$ $\quad susceptible$

$\frac{dI}{dt} = aSI - bI$ $\quad Infected$

$\frac{dR}{dt} = bI$ $\quad recovered$

Tip: You should note that the third equation does not influence the first two. So, it can be ignored. Using the first two equations only, develop a Python script that will plot the phase space of the model. You should get something like this as your output