(CS 5008) Reinforcement Learning : Assignment 2

Dynamical Systems

1 Write code to simulate the following dynamics

Q 1) Consider a tank with inflow of $x - m^3$ per second and outflow of $y - m^3$ per second, and the surface area of the tank is $z - m^2$. Considering the initial level at $t = 0$ to be s_0, what is the capacity s_t over time.?
Q 2) Consider a current source of 1 Ampere, a capacitor of 1 Faraday and resistor 1 Ohms, in parallel. Consider the voltage in the capacitor to be s_0 at $t = 0$. Find the voltage across the capacitor s_t over time?
Q 3) Consider a Queuing system where inter-arrival times and service times are exponentially distributed. In particular, customers arrive at times $t_1, t_2, \ldots, t_n, \ldots$, and $t_{n+1} - t_n \sim \exp(\lambda)$. The time taken by server to serve n^{th} customer is $d_n \sim \exp(\mu)$.