Computational Modelings of the SIR and SIS Epidemics

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A Basic Model

The most basic model of these curves incorporates the differential equations (6) and (7) found beta and mu as constants. (For the example, we set mu to 0.1 and beta to 0.75. This is somewł depth later on.) The results can be seen below.

```
import numpy as np
from scipy.integrate import odeint
import matplotlib.pyplot as plt

# Predefined Constants
mu = .1
beta = .75
n = 1000 # number of time steps
max_t = 100 # upper bound number of days

# Define differential equations
def sir(y, t):
    S = y[0]
    I = y[1]
    R = y[2]
    # Model equations
    dsdt = -beta * I * S
    didt = beta * I * S - mu * I
    drdt = mu * I
    return [dsdt, didt, drdt]

# Initial conditions
S0 = 0.99999
I0 = 0.00001
R0 = 0.0
y0 = [S0, I0, R0]
t = np.linspace(0, max_t, n)

# Solve Equations
```