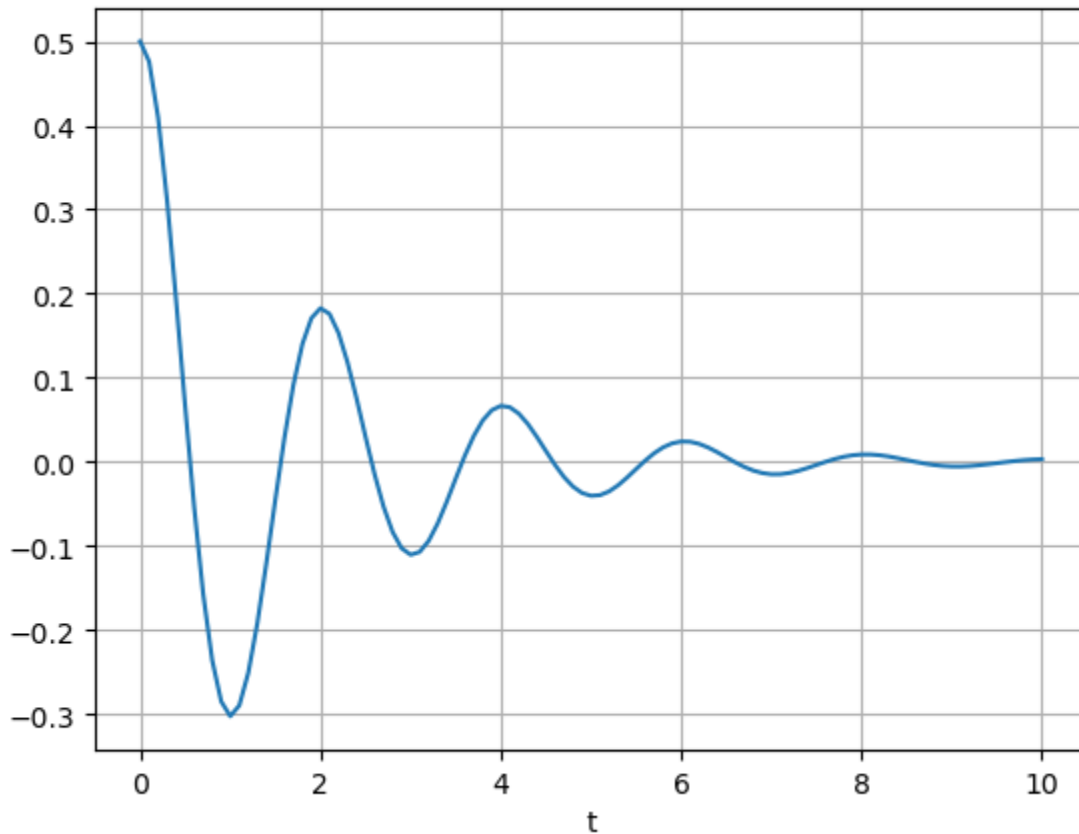


Prelab 3
Kieran Cosgrove

3. Mass spring damper system graph created



4. I would add the damping term similarly to how it is added to the mass spring damper system, by adding it to the \dot{x}_2 term and multiplying it by angular velocity since it is linear. Because the damping creates a torque, I would put it in the \dot{x}_2 term to reduce the angular acceleration.

released from rest.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} x_2 \\ -(k/m)x_1 - (b/m)x_2 + F(t)/m \end{bmatrix}$$

```
# define the system ODEs
def pendulum(x, t, m, g, l):
    xdot1 = x[1]
    xdot2 = -g*np.sin(x[0])/l
    # specify outputs
    y = 0
    return np.array([xdot1, xdot2]), y
```