3 Assignment 3

3.1

Consider the following ODE:

$$\dot{x} = -x \tag{1}$$

The general form for the Backward Euler Approximation Method is:

$$\hat{x}_{k+1} = \hat{x}_k + Tf(\hat{x}_{k+1}) \tag{2}$$

Plugging in $f(x) = -x$ and substituting x_k for $\hat{x}_k$ (assuming we are given an exact x_k), we get:

$$\hat{x}_{k+1} = x_k - T\hat{x}_{k+1} \tag{3}$$

as our implicit update function for finding $\hat{x}_{k+1}$ given x_k.