Nome: Carolina de Farias
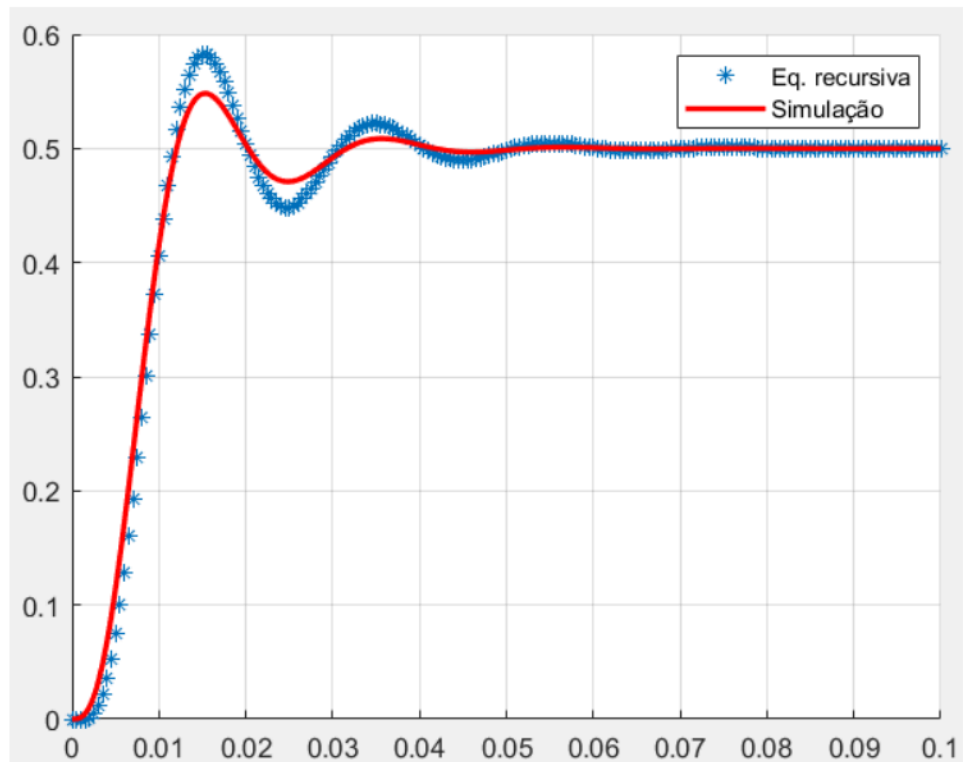
Prova 2 de controle

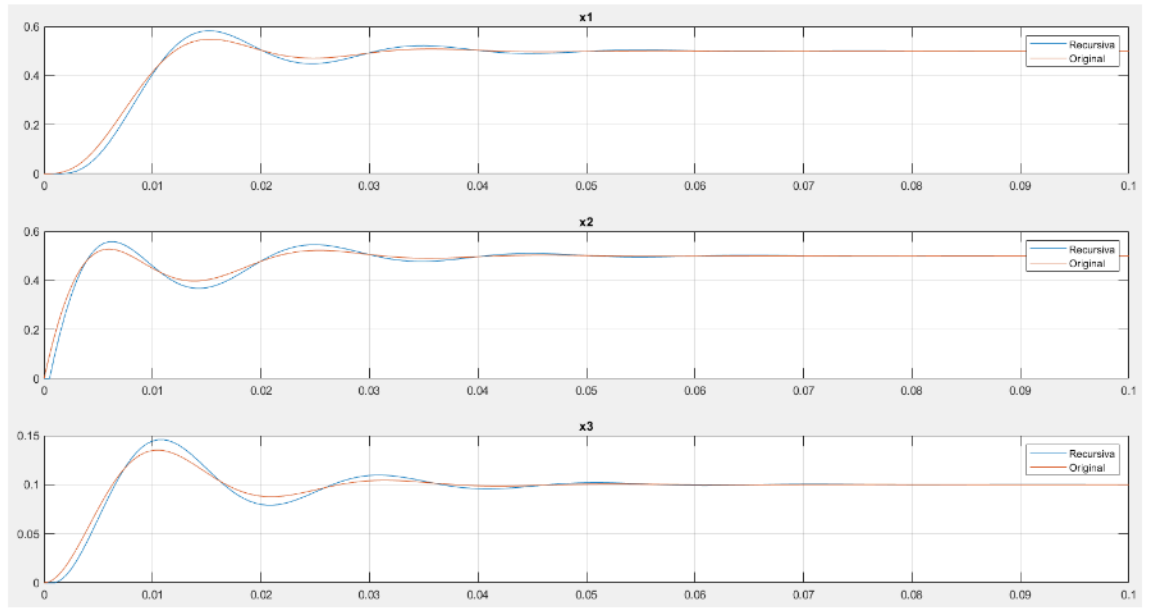a)

$$\dot{x} = \begin{bmatrix} -\dfrac{1}{C1R1} & 0 & \dfrac{1}{C1} \\ 0 & -\dfrac{1}{C2R2} & -\dfrac{1}{C2} \\ -\dfrac{1}{L} & \dfrac{1}{L} & 0 \end{bmatrix} \cdot \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ \dfrac{1}{C2R2} \\ 0 \end{bmatrix} \cdot u$$

$$y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} \cdot x$$

b)

Gráfico Vo(kt):



Estados observados:

c)

$$Ke = \begin{bmatrix} -0,8 \\ 0 \end{bmatrix}$$

$$\hat{A} = \begin{bmatrix} -200 & -200 \\ 50 & 0 \end{bmatrix}$$

$$\hat{B} = \begin{bmatrix} 0 \\ -90 \end{bmatrix}$$

$$\hat{F} = \begin{bmatrix} 200 \\ 0 \end{bmatrix}$$

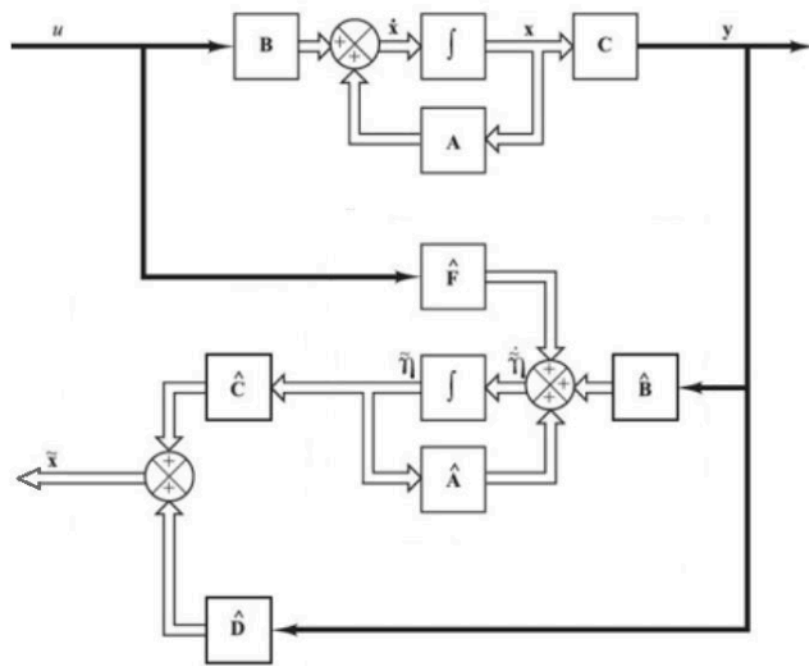$$\hat{C} = \begin{bmatrix} 0 & 0 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\hat{D} = \begin{bmatrix} 1 \\ -0,8 \\ 0 \end{bmatrix}$$

d)

$$\tilde{\eta}(k) = T * \dot{\tilde{\eta}}(k-1) + \tilde{\eta}(k-1)$$
$$\tilde{\eta}(k) = \hat{F} * U(k) + \hat{B} * Amostras(k) + \hat{B} * \tilde{\eta}(k)$$

$$\tilde{x}(k) = \hat{C} * \tilde{\eta}(k) + \hat{D} * Amostras(k)$$

e)

$$K = [6780 \quad 36{,}5 \quad 1580]$$

f)

|        | Valor teórico | Valor da Simulação |
|--------|---------------|--------------------|
| $M_P$  | 4.5988%       | 4.4927%            |
| $T_P$  | 0.0087982s    | 0.0094209s         |