Tarea 3 ALS-NL

2) b) $\frac{30}{s^2+12s+36} = \frac{30}{36}\,\frac{36}{s^2+12s+36} = \frac{5}{6}\,\frac{36}{s^2+12s+36}$

$\tau = \frac{1}{\xi\omega_n} = \frac{1}{(1)(6)} = \frac{1}{6}$

$T_s = \frac{1}{10}\tau = \frac{1}{6}\times\frac{1}{10} = \frac{1}{60} = 0{,}017\,s$ //

abr 3-02:33 p.m.

4.) a)

$G(s) = \frac{2}{s+5} = \frac{Y(s)}{X(s)}\cdot\frac{X(s)}{U(s)}$

$\frac{Y(s)}{X(s)} = 2$ $\quad y(t) = 2x(t)$

$\frac{X(s)}{U(s)} = \frac{1}{s+5}$ $\quad X(s)(s+5) = U(s)$

$\dot{x}(t) + 5x(t) = u(t)$

$\dot{x}(t) = -5x(t) + u(t)$

$x_1 = x(t)$

$\dot{x}_1 = \dot{x}(t) = -5x_1 + u = \dot{x}_1$

$y = 2x_1$

$\dot{x}_1 = [-5]x_1 + [1]u$

$y = [2]x_1$

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4.) b)

$G(s) = \frac{20}{s^2+12s+30} = \frac{Y(s)}{X(s)}\cdot\frac{X(s)}{U(s)}$

$y(t) = 20x(t)$

$\frac{X(s)}{U(s)} = \frac{1}{s^2+12s+30}$

$\ddot{x} + 12\dot{x} + 30x = u(t)$

$\ddot{x} = -12\dot{x} - 30x + u$

$x_1 = x \Rightarrow \dot{x}_1 = \dot{x} = x_2 = \dot{x}_1$

$x_2 = \dot{x}$

$y = 20x_1$ $\quad \dot{x}_2 = \ddot{x} = -12x_2 - 30x_1 + u = \dot{x}_2$

$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix} = \begin{bmatrix}0 & 1\\ -30 & -12\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix} + \begin{bmatrix}0\\ 1\end{bmatrix}u$

$y = \begin{bmatrix}20 & 0\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$

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4.) c)

$G(s) = \frac{26}{s^3+8s^2+29s+52} = \frac{Y(s)}{X(s)}\cdot\frac{X(s)}{U(s)}$

$y(t) = 26x(t)$

$\dddot{x}(t) + 8\ddot{x}(t) + 29\dot{x}(t) + 52x(t) = u(t)$

$x_1 = x \Rightarrow \dot{x}_1 = \dot{x} = x_2 = \dot{x}_1$

$x_2 = \dot{x} \Rightarrow \dot{x}_2 = \ddot{x} = x_3 = \dot{x}_2$

$x_3 = \ddot{x}$

$y = 26x_1$ $\quad \dot{x}_3 = \dddot{x} = -52x - 29\dot{x} - 8\ddot{x} + u$

$\dot{x}_3 = -52x_1 - 29x_2 - 8x_3 + u$

$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\\ \dot{x}_3\end{bmatrix} = \begin{bmatrix}0 & 1 & 0\\ 0 & 0 & 1\\ -52 & -29 & -8\end{bmatrix}\begin{bmatrix}x_1\\ x_2\\ x_3\end{bmatrix} + \begin{bmatrix}0\\ 0\\ 1\end{bmatrix}u$

$y = \begin{bmatrix}26 & 0 & 0\end{bmatrix}\begin{bmatrix}x_1\\ x_2\\ x_3\end{bmatrix}$

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5) a) $G(z) = \frac{0{,}06727}{z - 0{,}9231}$

$G(z) = \frac{0{,}06727\,z^{-1}}{1 - 0{,}9231\,z^{-1}} = \frac{Y(z)}{X(z)}\cdot\frac{X(z)}{U(z)}$

$\frac{Y(z)}{X(z)} = 0{,}06727\,z^{-1}$ Ec Salida

$\frac{X(z)}{U(z)} = \frac{1}{1 - 0{,}9231\,z^{-1}}$ Ec Entrada

$\Rightarrow$ Ec Entrada

$X(z) - 0{,}9231\,z^{-1}X(z) = U(z)$

$x(k) - 0{,}9231\,x(k-1) = u(k)$

$\Rightarrow$ Ec Salida

$Y(z) = 0{,}06727\,z^{-1}X(z)$

$y(k) = 0{,}06727\,x(k-1) \Rightarrow y(k) = 0{,}06727\,x_1$

$x_1 = x(k-1)$

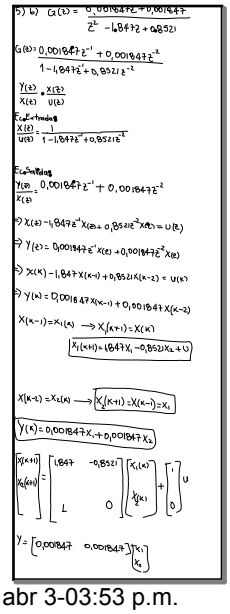
$x_1(k+1) = x(k)$

$x_1(k+1) = 0{,}9231\,x(k-1) + u(k) = 0{,}9231\,x_1 + u$

$[x(k+1)] = [0{,}9231][x_1] + [1]u$

$[y(k)] = [0{,}06727][x_1]$

abr 3-03:34 p.m.



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