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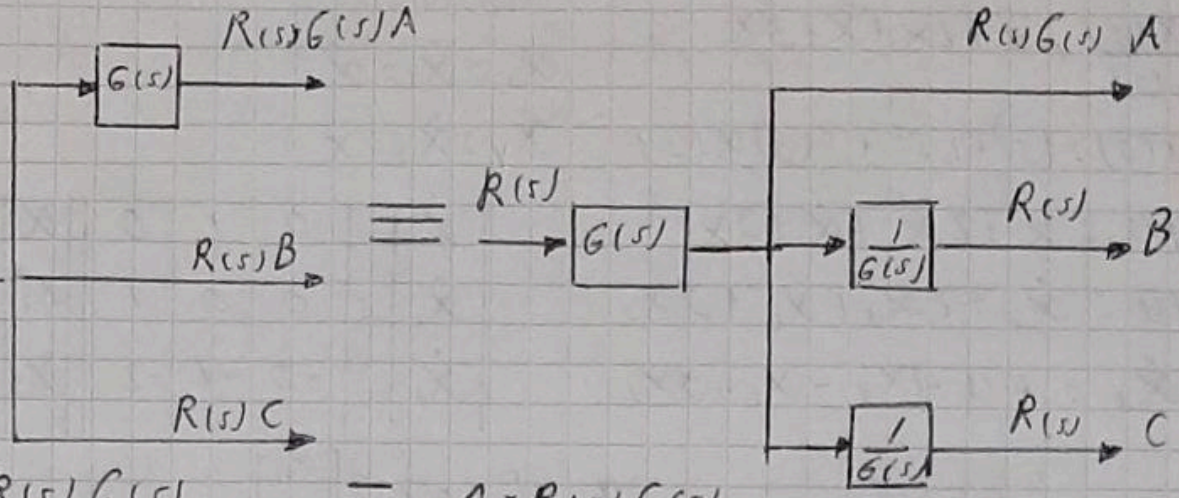
Código: 2021100510G

Tarea 4

1) $R(s)$

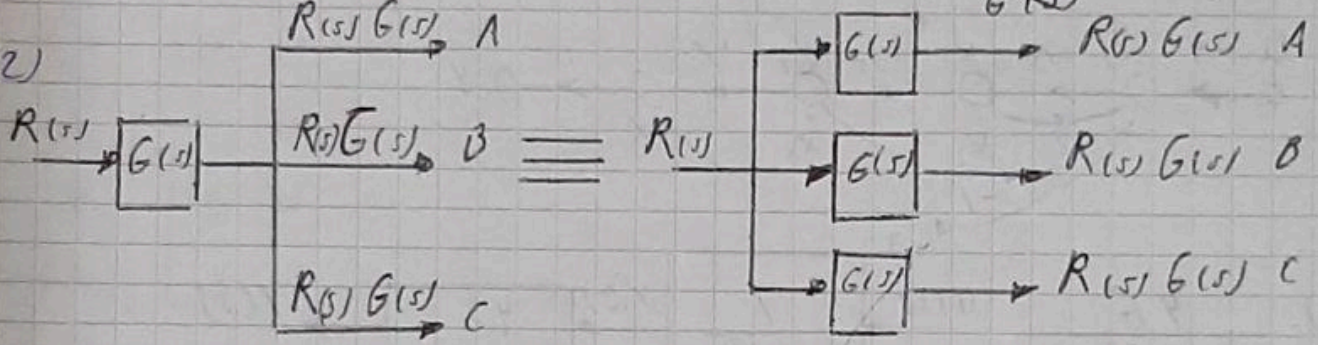


$A = R(s)\,G(s) \equiv A = R(s)\,G(s)$

$B = R(s) \equiv B = R(s)\,G(s)\,\frac{1}{G(s)} = R(s)$

$C = R(s) \equiv C = R(s)\,G(s)\,\frac{1}{G(s)} = R(s)$

2)



$A = R(s)\,G(s) = R(s)\,G(s) = R(s)\,G(s) = A$

$B = R(s)\,G(s) = R(s)\,G(s) = R(s)\,G(s) = B$

$C = R(s)\,G(s) = R(s)\,G(s) = R(s)\,G(s) = C$

$R(s)\,G(s)\,(A + B + C)$

$A = R(s)\,G(s)$

$B = R(s)\,G(s)$

$C = R(s)\,G(s)$

$R(s)\left(\underbrace{G(s)}_{A} + \underbrace{G(s)}_{B} + \underbrace{G(s)}_{C}\right)$

$\underbrace{R(s)\,G(s)}_{A} + \underbrace{R(s)\,G(s)}_{B} + \underbrace{R(s)\,G(s)}_{C}$

Tarea 3 Bono Parcial

1) $G(s) = \frac{4}{s^3+2s^2+5+3}$

$\frac{X(s)}{U(s)} = \dddot{x} + 2\ddot{x} + \dot{x} + 3x$

$4U(s) = (s^3+2s^2+5+3)X(s)$

$4u = \dddot{x} + 2\ddot{x} + \dot{x} + 3x$

$4u = \dot{x}_3 + 2x_3 + x_2 + 3x_1$

$\dot{x}_3 = 4u - 2x_3 - x_2 - 3x_1$

$x_1 = x$

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

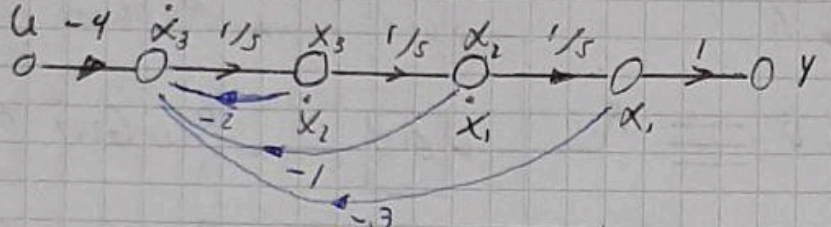
$x_3 = \dot{x}_2 = \ddot{x}$

$\dot{x}_3 = \ddot{x}_2 = \dddot{x}$

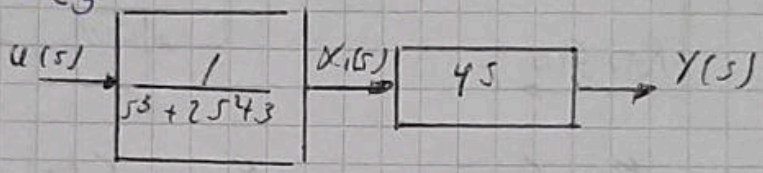
$$\begin{vmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{vmatrix} = \begin{vmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -3 & -1 & -2 \end{vmatrix} \begin{vmatrix} x_1 \\ x_2 \\ x_3 \end{vmatrix} + \begin{vmatrix} 0 \\ 0 \\ -4 \end{vmatrix} u$$

$$x_1 = [1\ 0\ 0] \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

Diagrama de flujo de señal



2) $G(s) = \frac{4G}{s^3+2s^2+3}$



$\frac{X_1(s)}{U(s)} = \frac{1}{s^3+2s^2+3}$

$(X_1(s)(s^3+2s^2+3) = U(s)$

$\downarrow \mathcal{L}^{-1}$

$(s^3X_1 + 2s^2X_1 + 3X_1) = U(s)$

$\dddot{x} + 2\ddot{x} + 3x = u$

$\dddot{x} = -2\ddot{x} - 3x + u$

$\dot{x}_3 = -2x_3 - 3x_1 + u$

$x_1 = x$

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

$x_3 = \dot{x}_2 = \ddot{x}_1 = \ddot{x}$

$\dot{x}_3 = \ddot{x}_2 = \dddot{x}_1 = \dddot{x}$

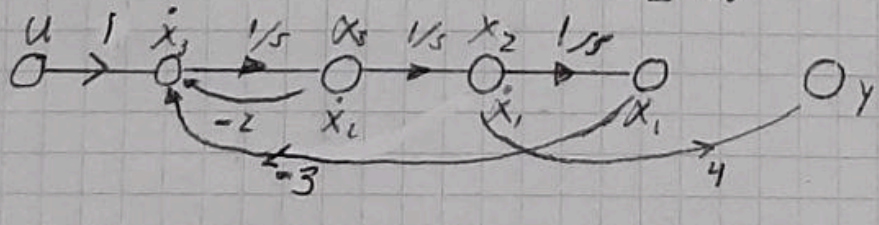
$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -3 & 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

$Y = 4s(X_1)$

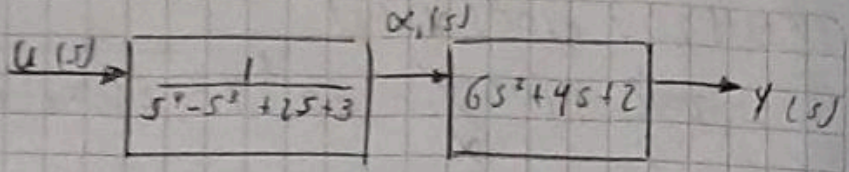
$4\dot{x}$

$Y = 4x_2$

$$Y = [0\ 4\ 0] \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$



3) $G(s) = \dfrac{6s^2+4s+2}{s^4-s^3+2s+3}$



$\dfrac{X_1(s)}{U(s)} = s^4 - s^3 + 2s + 3$

$[s^4 - s^3 + 2s + 3]\, X_1(s) = U(s)$

$\mathcal{L}^{-1}$ ↓

$\ddddot{x}_1 - \dddot{x}_1 + 2\ddot{x}_1 + 3x_1 = u$

$\dot{x}_4 = x_4 - 2x_2 - 3x_1 - u$

$\dfrac{Y}{X_1(s)} = 6s^2 + 4s + 2$

$x_1 = x$

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

$x_3 = \dot{x}_2 = \ddot{x}_1 = \ddot{x}$

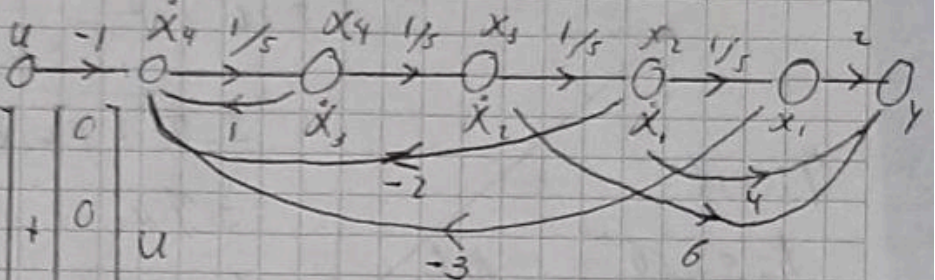
$x_4 = \dot{x}_3 = \ddot{x}_2 = \dddot{x}_1 = \dddot{x}$

$\dot{x}_1 = \ddddot{x}$

$\Rightarrow Y(s) = (6s^2 + 4s + 2)\, X_1 \rightarrow \mathcal{L} \rightarrow Y = 6\ddot{x} + 4\dot{x} + 2x$

$Y = 6x_3 + 4x_2 + 2x_1$

$Y = [2\ 4\ 6\ 0] \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$



$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \\ \dot{x}_4 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ -3 & -2 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 0 \\ -1 \end{bmatrix} u$$