



ITESO

Universidad Jesuita
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Sistema de Control Automatico.

TPE 1.2

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TP E 1.2

$$\frac{Y(s)}{U(s)} = \frac{\frac{4}{5}s^3 - \frac{3}{5}}{s^3 + \frac{1}{5}s^2 + \frac{1}{5}s + \frac{1}{5}} \quad \begin{matrix} m=3 \\ n=3 \end{matrix}$$

comd $m=n$

$$s^3 + \frac{1}{5}s^2 + \frac{1}{5}s + \frac{1}{5} \quad \begin{matrix} \frac{4}{5}s^3 - \frac{3}{5} \\ -\frac{1}{5}s^2 - \frac{1}{5}s - \frac{1}{5} \\ \hline \frac{5}{5}s^2 - \frac{6}{5}s - \frac{4}{5} \\ -\frac{1}{5}s^2 - \frac{1}{5}s - \frac{1}{5} \\ \hline \frac{4}{5}s - \frac{3}{5} \\ -\frac{1}{5}s - \frac{1}{5} \\ \hline \frac{3}{5}s - \frac{2}{5} \\ -\frac{1}{5}s - \frac{1}{5} \\ \hline \frac{2}{5}s - \frac{1}{5} \\ -\frac{1}{5}s - \frac{1}{5} \\ \hline \frac{1}{5}s - \frac{1}{5} \\ -\frac{1}{5}s - \frac{1}{5} \\ \hline 0 \end{matrix}$$

$$\frac{Y(s)}{U(s)} = \frac{4}{5} - \frac{\frac{16}{25}s^2 + \frac{20}{25}s + \frac{47}{25}}{s^3 + \frac{1}{5}s^2 + \frac{1}{5}s + \frac{1}{5}} \quad \begin{matrix} m=2 \\ n=3 \end{matrix} \quad n > m \quad \checkmark$$

$$= - \quad \begin{matrix} a_0 = -\frac{16}{25} & a_1 = -\frac{20}{25} & a_2 = -\frac{47}{25} \\ b_0 = -\frac{47}{25} & b_1 = -\frac{20}{25} & b_2 = -\frac{16}{25} \end{matrix} \quad D = \frac{4}{5}$$

$$\dot{x}(t) = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ \frac{16}{25} & \frac{20}{25} & \frac{47}{25} \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u(t)$$

$$y(t) = \begin{bmatrix} -\frac{47}{25} & -\frac{20}{25} & -\frac{16}{25} \end{bmatrix} x(t) + \frac{4}{5} u(t)$$