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Problema # 1

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a) (10)

$$2\frac{d^2x}{dt^2} + \frac{dx}{dt} = y + 2\frac{dy}{dt}$$

$$2\frac{dx}{dt} + x = \int_0^t y\,dt + 2y$$

clase PI T_1

b) (10)

$$\frac{d^2x}{dt^2} - 5\frac{dx}{dt} + 6x = 4y \quad // \div 1/6$$

$$\frac{1}{6}\frac{d^2x}{dt^2} - \frac{5}{6}\frac{dx}{dt} + x = \frac{4}{6}y \qquad \text{clase } PT_2$$

$$T^2 = \frac{1}{6} \rightarrow T = \frac{1}{\sqrt{6}} \approx 0.4082$$

$$2DT = -\frac{5}{6} \rightarrow D = \frac{-5}{2T(6)} = \frac{-5}{2(0.4082)(6)} = -1.021$$

$$T = 0.4082, \quad D = -1.021$$

$$D^2 - (-1.021)^2 = 1.042 \qquad D^2 > 1$$

$$h(t) = K\left[\frac{P_2}{P_1 - P_2}e^{P_1 t} + \frac{P_1}{P_2 - P_1}e^{P_2 t} + 1\right]$$

$$P_1 = \frac{-D + \sqrt{D^2 - 1}}{T}, \quad P_2 = \frac{-D - \sqrt{D^2 - 1}}{T}$$

$$P_1 = \frac{-(-1.021) + \sqrt{(-1.021)^2 - 1}}{0.4082}$$

$$P_1 = 3.006$$

$$P_2 = \frac{-(-1.021) - \sqrt{1.042 - 1}}{0.4082}$$

$$P_2 = \frac{2}{3}$$ X ?

¿Cómo lo obtuvo?

Función Característica:

$$h(t) = \frac{2}{3}\left[\frac{1.999}{3.006 - 1.999} e^{3.006t} + \frac{3.006}{1.999 - 3.006} e^{1.999t} + 1\right]$$

$$h(t) = \frac{2}{3}\left[(1.985) e^{3.006t} - 2.985 e^{1.999t} + 1\right], \quad t > 0$$ OK