

# Hoja de Resultados

## Ejercicio 1

$$K(s) = \frac{bs+1}{as+1}$$

$$\left. \begin{array}{l} r_1 = 2 \\ r_2 = 3 \\ r_3 = 4 \end{array} \right\} \rightarrow \begin{array}{l} a = 1 \\ b = 2/3 \end{array} \xrightarrow{\text{simulo}} \left\{ \begin{array}{l} SO_1 = \frac{Y_{max} - Y_{establecida}}{Y_{estab} - Y_0} = \frac{1.07 - 1}{1 - (-1)} = 0.035 \\ \downarrow \\ 3.5\% \end{array} \right.$$

## Ejercicio 2

Como  $r_2 = 3 \rightarrow$  Trapezoidal (Tustin)  $\rightarrow s \approx \frac{2}{T} \frac{z-1}{z+1} \rightarrow T = 0.25$

$$K(z) = D(z) = \frac{b \frac{2}{T} \frac{z-1}{z+1} + 1}{a \frac{2}{T} \frac{z-1}{z+1} + 1} = \frac{2bz - 2b + Tz + T}{2az - 2a + Tz + T} = \frac{(T+2b)z + (T-2b)}{(T+2a)z + (T-2a)}$$

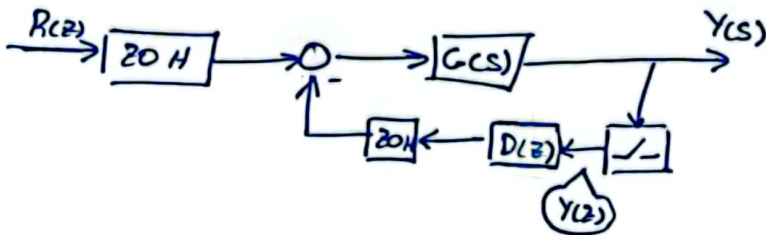
$$D(z) = \frac{(T+4/3)z + (T-4/3)}{(T+2)z + (T-2)} \quad \leftarrow$$

$$T_c = 0.737$$

$$e = 0.4005$$

$$SO_2 = \frac{1.269 - 1}{1 - (-1)} \times 100 = 13.45\% \quad \leftarrow$$

## Ejercicio 3



$$\begin{aligned} Y(z) &= \mathcal{Z}[Y(s)] = \mathcal{Z}[G(s)(ZOH \cdot R(z) - ZOH \cdot D(z) Y(z))] \\ &= \mathcal{Z}[G(s) \cdot ZOH \cdot R(z) - G(s) ZOH D(z) Y(z)] \end{aligned}$$

$$= \mathcal{Z}[G(s) ZOH] R(z) - \mathcal{Z}[G(s) ZOH] D(z) Y(z) = Y(z)$$

$$Y(z) = \frac{\mathcal{Z}[G(s) ZOH]}{1 + \mathcal{Z}[G(s) ZOH] D(z)} R(z) \quad \leftarrow$$