# Ajuste valor final con compensador de atrazo

Tarea #8

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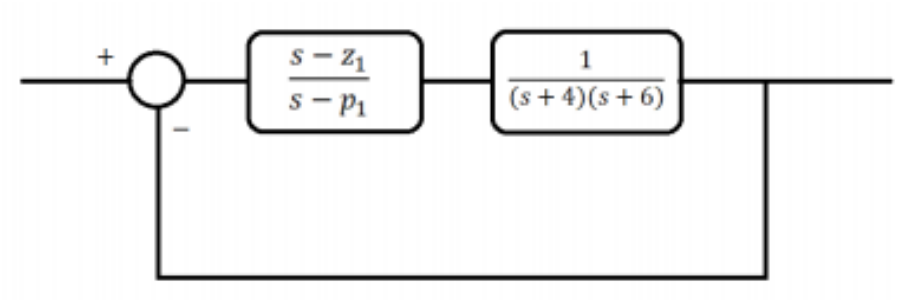
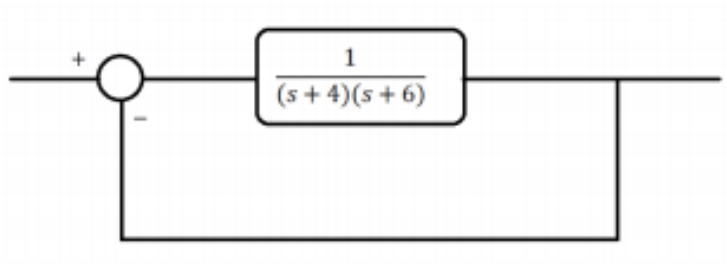


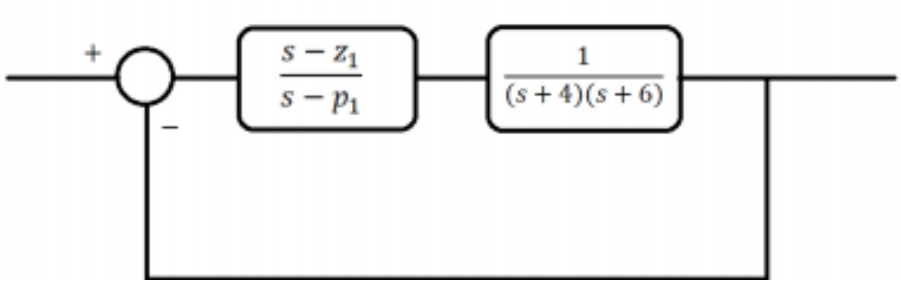

1. Error al escalón sin compensador




$$Kp = \lim_{s\to 0} s \cdot \frac{1}{(s+4)(s+6)} \cdot \frac{1}{s} \quad \rightarrow \quad \frac{1}{4\cdot 6} \quad \rightarrow \quad \frac{1}{24}$$

$$e_{ss} = \frac{1}{1+kp} = \frac{1}{1+\frac{1}{24}} = 0{,}96$$

2. Proponga un compensador para que el error aumente un 20%



$$kp = \lim_{s\to 0} s \cdot \frac{(s - z_1)}{(s - p_1)(s+4)(s+6)} \cdot \frac{1}{s} \quad \rightarrow \quad \frac{z_1}{24p_1}$$

$$e_{ss} = \frac{1}{1+kp} = \frac{1}{1+\frac{z_1}{24p_1}} = 1{,}152$$

$$\frac{z_1}{24p_1} = x$$

$$\frac{1}{1+x} = 0{,}774 \quad \rightarrow \quad x = -0{,}1319$$

$$z_1 = -0{,}13194 \cdot 24p_1 \quad \rightarrow \quad \frac{z_1}{p_1} = -3{,}1665$$

$$z_1 = -3{,}1665 \qquad p_1 = 1$$

$$e_{ss} = \frac{1}{1+\frac{1}{-3{,}1665}} = 1{,}4615$$