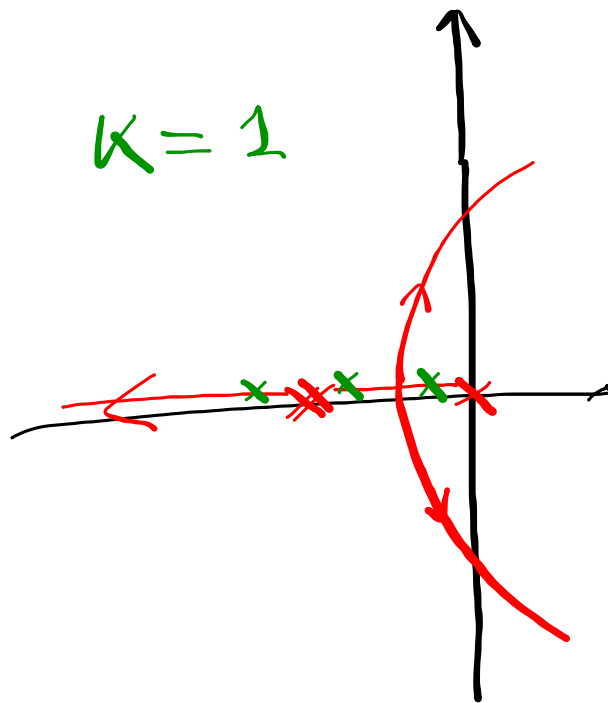


Dato $G(s) = \frac{1}{s(s+5)^2}$

Ricavare K :

$R(s) = K \frac{1 + \frac{s}{4.8}}{1 + \frac{s}{4.5}}$ tale che:

$$\begin{cases} T_a \leq 2.5s \\ S\% \leq 1\% (\delta \geq 0.85) \end{cases}$$



$$T_d = \frac{3}{\delta \omega_n} \rightarrow \text{pole dominante}$$

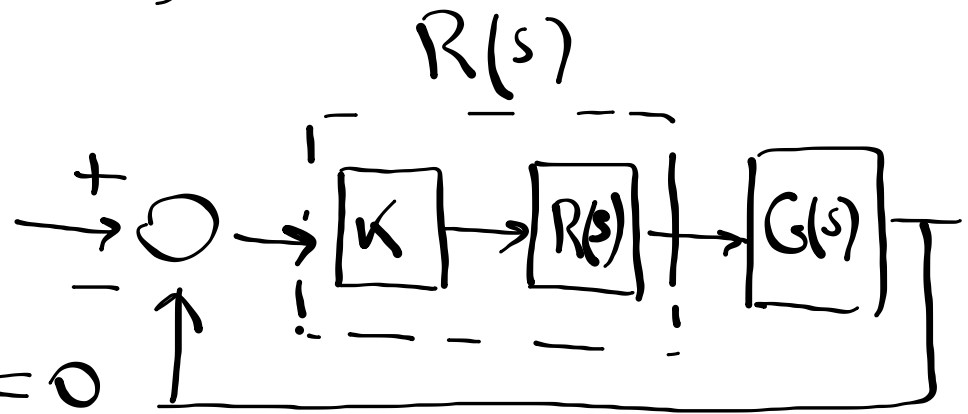
$$T_d = 1/0.0497$$

$$1) G_a = R(s) \cdot G(s)$$

Luogo radici

$$1 + K R(s) G(s) = 0$$

al variare di $K \geq 0$



K primo tentativo

$$K^{(1)} = 22.31$$

$$\left\{ \begin{array}{l} \bar{T}_a \simeq 2.60 \text{ s} \end{array} \right. \leq \cancel{2.5 \text{ s}}$$

$$\left\{ \begin{array}{l} S\% = 0.47\% \leq 1\% \end{array} \right. \left| \begin{array}{l} K \uparrow \quad \bar{T}_a \downarrow \\ S\% \uparrow \end{array} \right.$$

Secondo tentativo

$$K^{(2)} = 23$$

$$\left\{ \begin{array}{l} T_a = 2.48 \text{ s.} \\ S\% = 0.69\% \end{array} \right. \quad (10 \text{ s}) \quad \boxed{K=23}$$

2) Progetto regolatore
digitale

$$T = \frac{2.5}{100} \quad \underline{T_a = 2.5 \text{ s}}$$

Discretizz. di Tustin

$$R(z) = R(s) / \left(s = \frac{z-1}{z+1} \right)$$

Per $R(z)$

$$K = 23$$

$$\left\{ \begin{array}{l} T_a = 2.41 \text{ s} \end{array} \right.$$

$$\left\{ \begin{array}{l} S\% = 0.92\% \end{array} \right. \quad \underline{\text{OK!}}$$