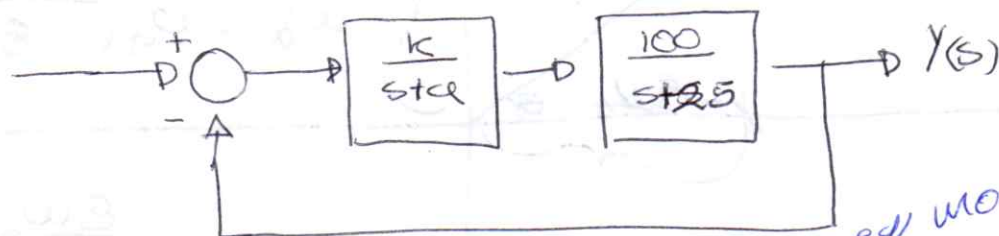


$$K = ?$$

8)

$$M_p \leq 25\% ; t_s \leq 0,1 \text{ s}$$

a)

FTMF ~~per~~ modello

$$t_s = \frac{4}{\xi \omega_n} \leq 0,1 \Rightarrow \xi \omega_n \geq 40$$

$$M_p = e^{-\frac{\xi \pi}{\sqrt{1-\xi^2}}} \leq 0,25 \Rightarrow \xi \geq 0,403$$

b)

$$\frac{\frac{100K}{(s+a)(s+25)}}{1 + \frac{100K}{(s+a)(s+25)}} \Leftrightarrow \frac{100K}{(s+a)(s+25)} \cdot \frac{1}{1 + \frac{100K}{(s+a)(s+25)}}$$

$$\frac{100K}{(s+a)(s+25) + 100K} = \frac{100K}{s^2 + 25s + as + 25a + 100K}$$

$$= \frac{100K}{s^2 + (25+a)s + (25a+100K)}$$

allora a destrutturata
nell!

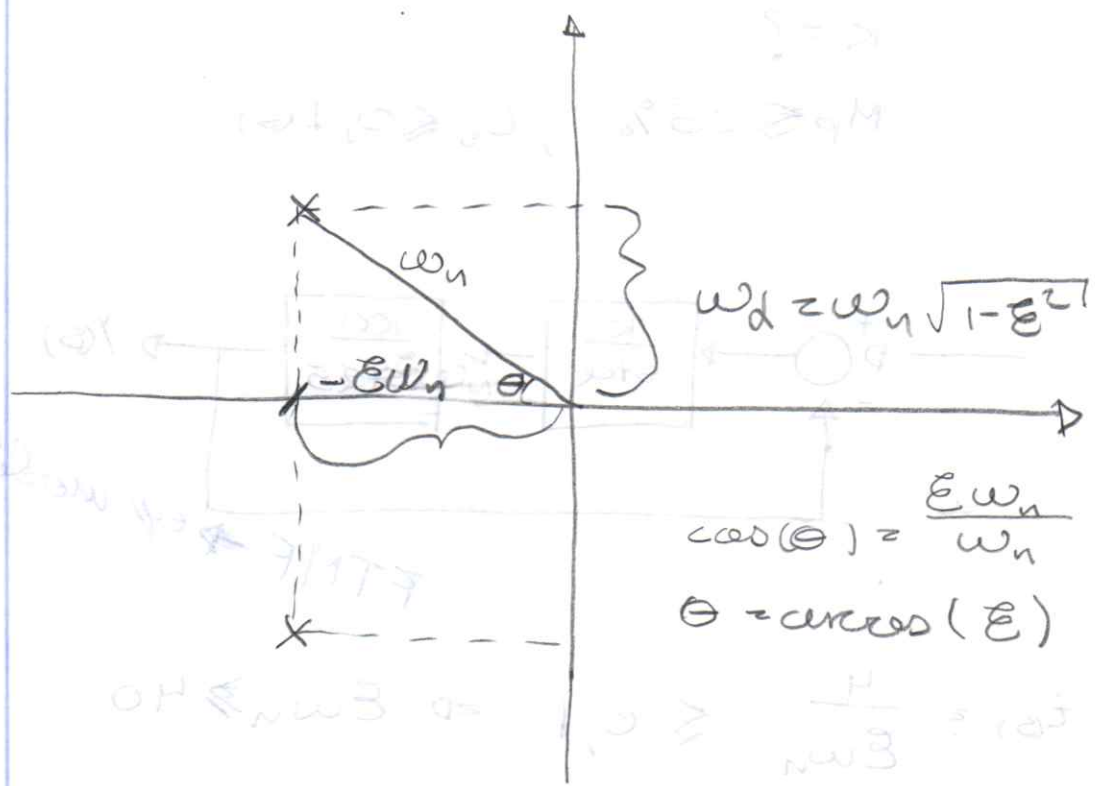
$$\Rightarrow 25a + 100K = \omega_n^2$$

$$(25+a) = 2\xi\omega_n = 80 \Rightarrow \omega_n = 99,25$$

$$a = 55$$

$$1375 + 100K = 9850,56$$

$$K = 84,755$$



$$\begin{aligned}
 & \frac{1}{1 + \frac{100K}{(s+1)(s+2)}} \\
 &= \frac{1}{1 + \frac{100K}{s^2 + 3s + 2}} \\
 &= \frac{s^2 + 3s + 2}{s^2 + 3s + 2 + 100K} \\
 &= \frac{s^2 + 3s + 2}{s^2 + 3s + 102K + 2} \\
 &= \frac{s^2 + 3s + 2}{s^2 + 3s + 102K + 2}
 \end{aligned}$$