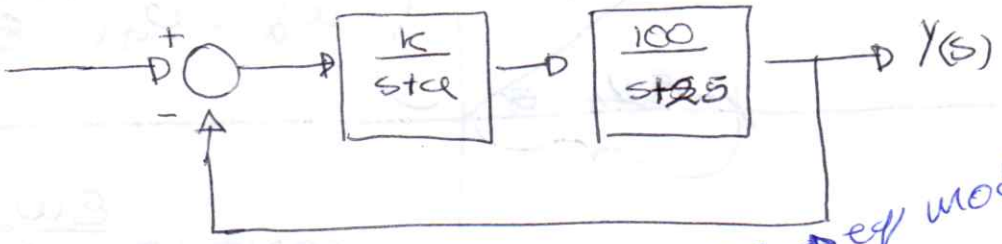
$K = ?$

8) $M_p \leq 25\% \quad ; \quad t_s \leq 0,1\,(s)$

a)



FTMF ⇒ eq modello

$$t_{(5)} = \frac{4}{\xi\omega_n} \leq 0,1 \Rightarrow \xi\omega_n \geq 40$$

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

b)

$$\frac{\frac{100K}{(s+a)(s+25)}}{1 + \frac{100K}{(s+a)(s+25)} \cdot 1} \Leftrightarrow \frac{100K}{(s+a)(s+5)} \cdot \frac{1}{1 + \frac{100K}{(s+a)(s+5)}}$$

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

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

olha a desatenção nell!

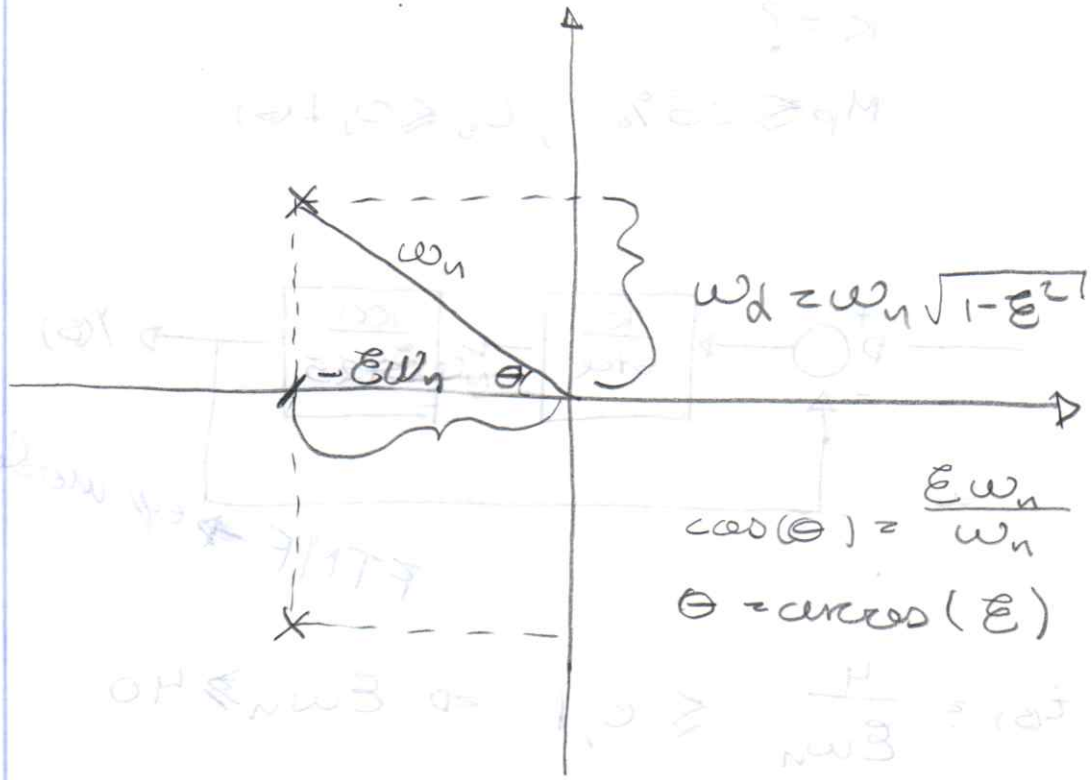
$$\Rightarrow \quad 25a + 100K = \omega_n^2$$

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

$$a = 55$$

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

$$K = 84,755$$



$$\cos(\theta) = \frac{\xi\omega_n}{\omega_n}$$

$$\theta = \arccos(\xi)$$