Polos del sistema de segundo orden(general):

$$s^2 + 2\xi\omega_n s + \omega_n^2 = 0$$

$$s_{1,2} = \frac{-2\xi\omega_n \pm \sqrt{(2\xi\omega_n)^2 - 4\omega_n^2}}{2}$$

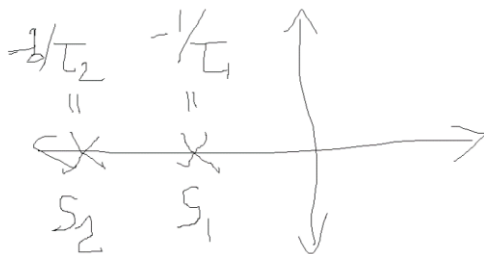$$s_{1,2} = \frac{-2\xi\omega_n \pm \sqrt{4\xi^2\omega_n^2 - 4\omega_n^2}}{2}$$

$$s_{1,2} = \frac{-2\xi\omega_n \pm \sqrt{4\omega_n^2(\xi^2 - 1)}}{2}$$

$$s_{1,2} = \frac{-2\xi\omega_n \pm 2\omega_n\sqrt{\xi^2 - 1}}{2}$$

$$s_{1,2} = -\xi\omega_n \pm \omega_n\sqrt{\xi^2 - 1}$$

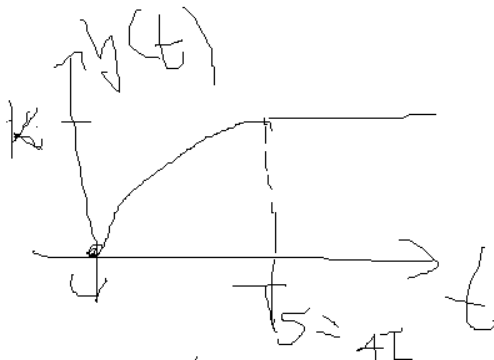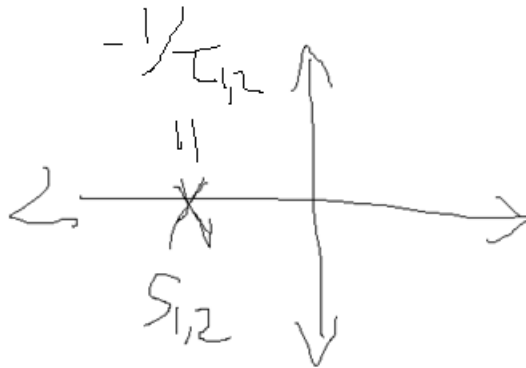$$s_{1,2} = \omega_n\left(-\xi \pm \sqrt{\xi^2 - 1}\right)$$

Caso 1:

$$T_s = 4(\tau_1 + \tau_2)$$

$$\boxed{s_1 = -\xi\omega_n + \omega_n\sqrt{\xi^2 - 1} \ \in \ \mathbb{R}} \ (3)$$

$$\boxed{s_2 = -\xi\omega_n - \omega_n\sqrt{\xi^2 - 1} \ \in \ \mathbb{R}} \ (4)$$
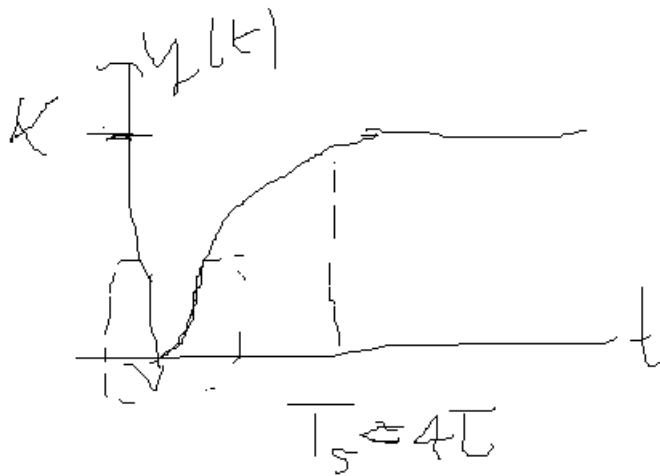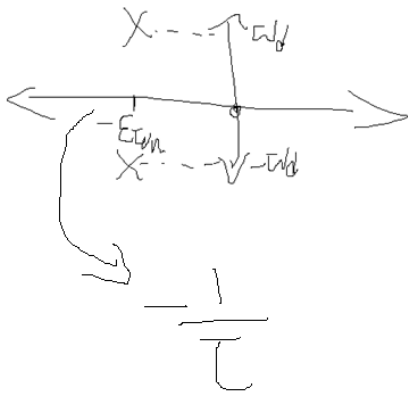
Caso 2:

$$\boxed{s_1 = -\omega_n < 0 \in \mathbb{R} \ \forall \ \xi = 1} \ (6)$$

$$\boxed{s_2 = -\omega_n < 0 \in \mathbb{R} \ \forall \ \xi = 1} \ (7)$$
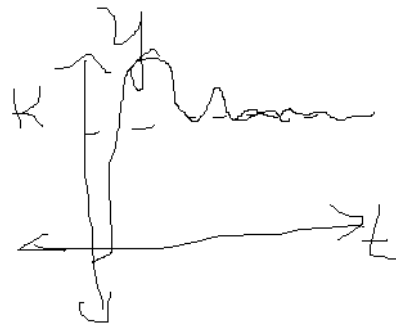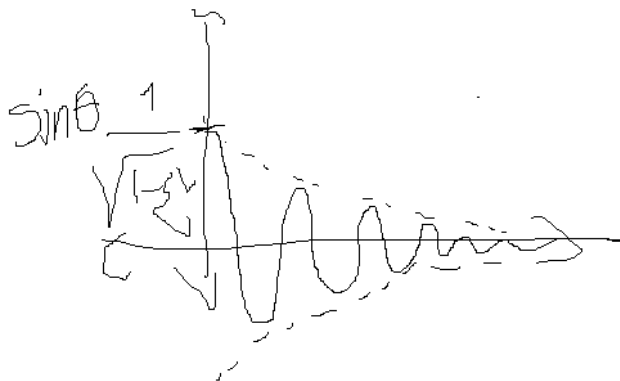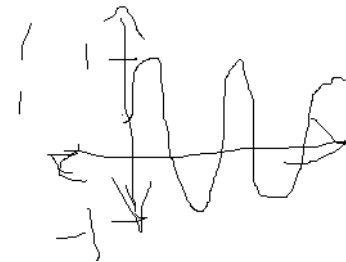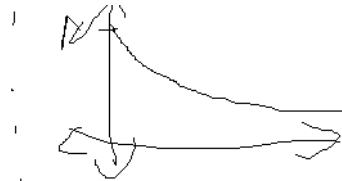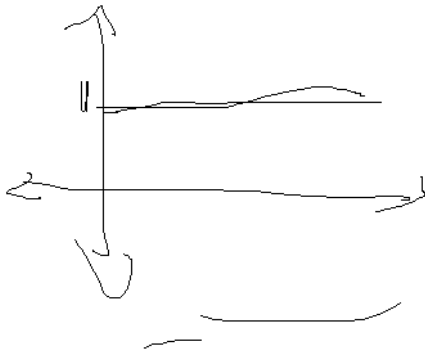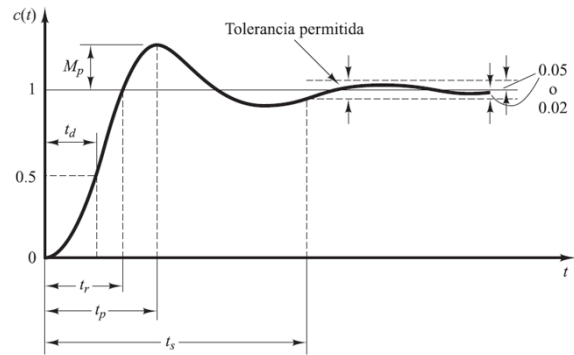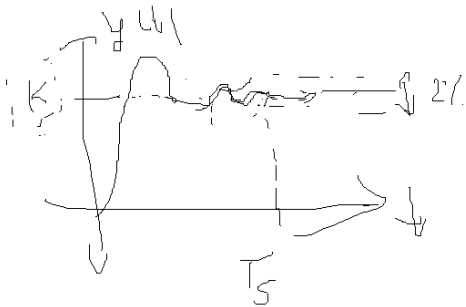
$$T_s = 4(\tau_1 + \tau_2)$$

Caso 3:

$$s_{1,2} = -\xi\omega_n \pm j\omega_n\sqrt{1-\xi^2}$$

$$\boxed{s_{1,2} = -\sigma \pm \omega_d j \in \mathbb{C} \;\forall\; 0 < \xi < 1}\;(9)$$
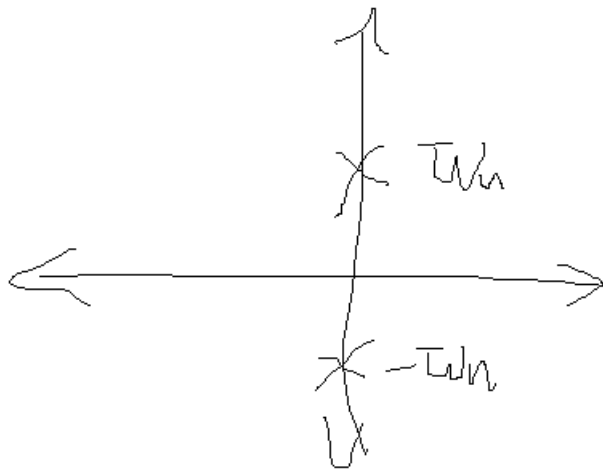
$$SO(\%) = 100e^{\frac{-\xi\pi}{\sqrt{1-\xi^2}}}$$

$$SO = \frac{y_{max} - y_{ss}}{y_{ss}} = e^{\frac{-\xi\pi}{\sqrt{1-\xi^2}}}$$

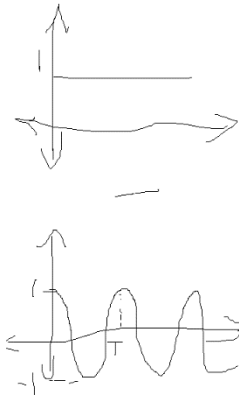$$T_s \approx 4\tau = \frac{4}{\xi\omega_n}\,(2\%)$$

Caso 4:

$$\boxed{s_1 = \omega_n j \in \mathbb{I}\ \forall\,\xi = 0}\ (14)$$

$$\boxed{s_2 = -\omega_n j \in \mathbb{I}\ \forall\,\xi = 0}\ (15)$$

Polos dominantes:

$$H(s) = \frac{2.3}{s^2 + 0.4s + 1}, \omega_n = 1, k = 2.3, \zeta = 0.2$$