Polos del sistema de segundo orden(general):

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

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

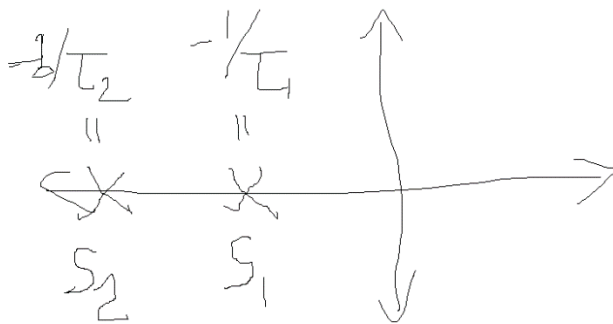$$s_{1,2} = \frac{-2\xi\omega_n \pm \sqrt{4\xi^2\omega_n^2 - 4\omega_n^2}}{2}$$

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

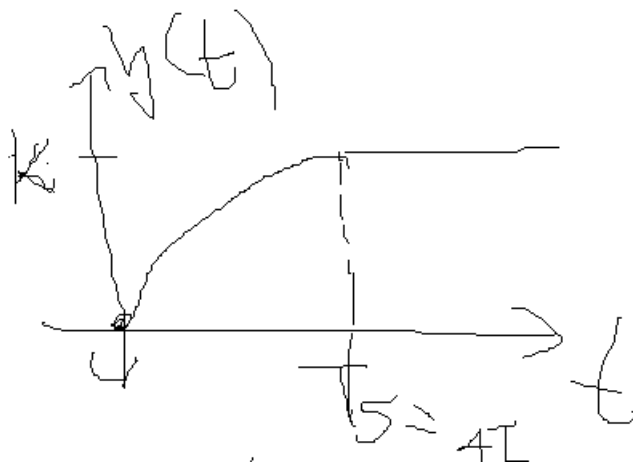$$s_{1,2} = \frac{-2\xi\omega_n \pm 2\omega_n\sqrt{\xi^2 - 1}}{2}$$

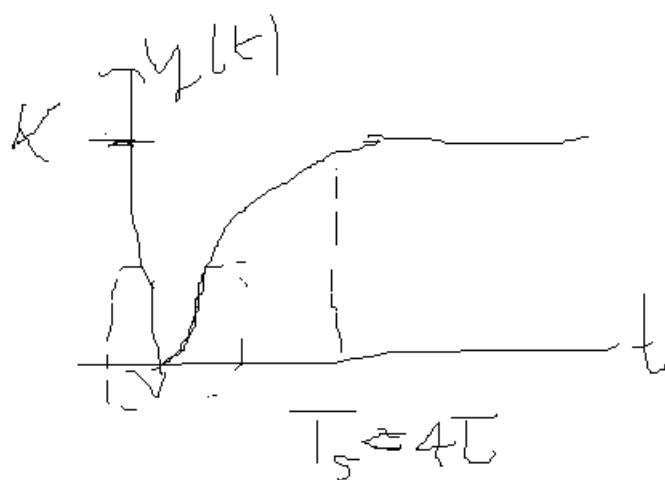$$s_{1,2} = -\xi\omega_n \pm \omega_n\sqrt{\xi^2 - 1}$$

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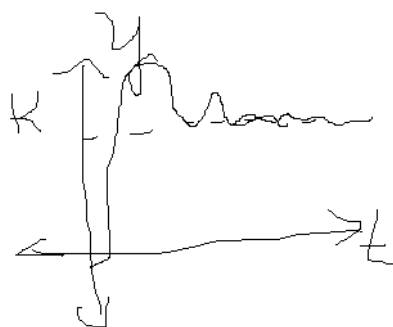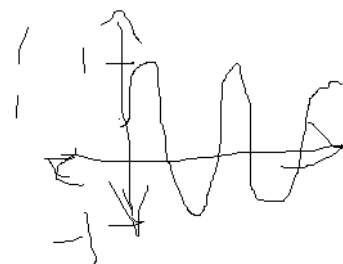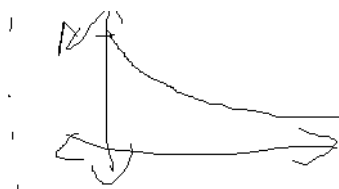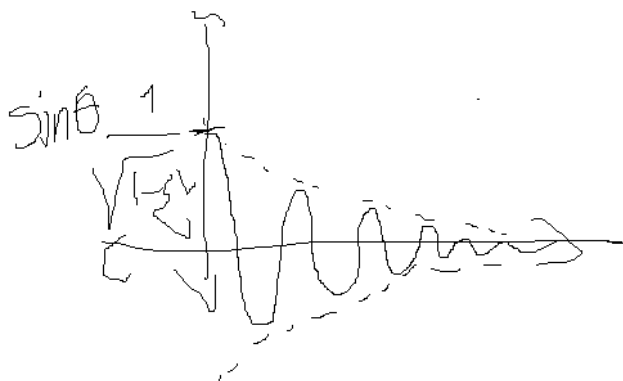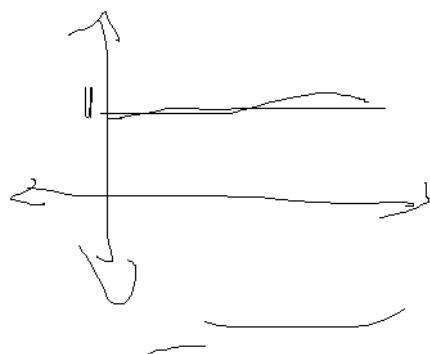
Caso 1:

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

Caso 2:

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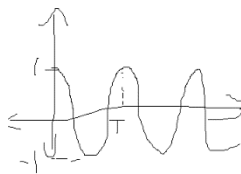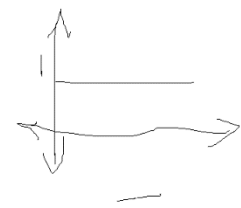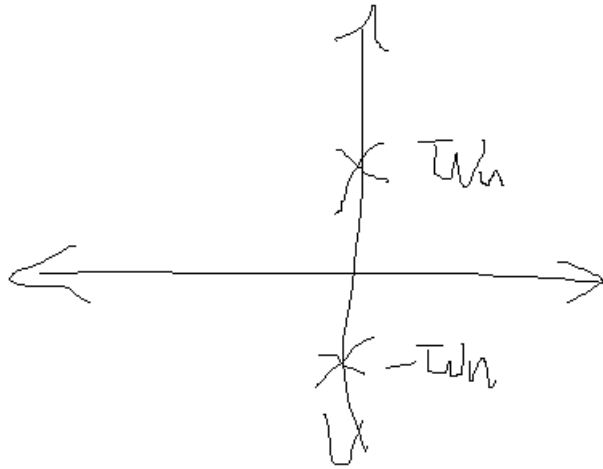

$$T_s \cong 4\tau$$

Caso 3:
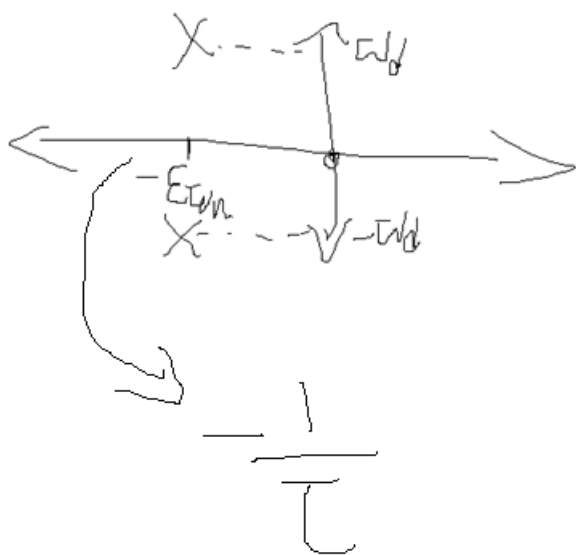
$$SO(\%) = 100e^{\frac{-\xi\pi}{\sqrt{1-\xi^2}}}$$

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

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

Caso 4:

$$T = \frac{1}{F}$$

$$\omega_n = 2\pi f = \frac{2\pi}{T}$$

$$T = \frac{2\pi}{\omega_n}$$