HOJA N° 1

# TPL4

1) si $\alpha_{max} = 1dB \rightarrow \xi^2 = 10^{\frac{\alpha_{max}dB}{10}} - 1 \rightarrow \boxed{\xi^2 = 0{,}259}$

tomando la transferencia normalizada del TPL3, $\Omega_z = R_3$ y $\Omega_\omega = \omega_0$

$$T(s)_{norma} = \frac{(-1) \cdot K}{s^2 + s \cdot \frac{1}{Q} + 1} \rightarrow \boxed{n = 2}$$

$$\text{si } T(\omega) = \frac{1}{1 + \xi^2 \cdot \omega^{2n}} \rightarrow |T(s)|^2 \Big|_{\omega = \frac{s}{j}} = \frac{1}{1 + \xi^2 \cdot (-j)^{2n} \cdot s^{2n}}$$

$$\text{si } n = 2 \rightarrow \therefore \rightarrow |T(s)|^2 = \boxed{\frac{\frac{1}{\xi^2}}{s^4 + \frac{1}{\xi^2}}} \quad (1)$$

$$T(s) \cdot T(-s) = \frac{(-1) \cdot K}{\left(s^2 + s \cdot \frac{1}{Q} + 1\right)} \cdot \frac{(-1) \cdot K}{\left(s^2 - s \cdot \frac{1}{Q} + 1\right)}$$

$$|T(s)|^2 = \frac{K^2}{s^4 - \cancel{s^3 \frac{1}{Q}} + s^2 + \cancel{s^3 \cdot \frac{1}{Q}} - s^2 \cdot \frac{1}{Q^2} + \cancel{s \cdot \frac{1}{Q}} + s^2 - \cancel{s \cdot \frac{1}{Q}} + 1}$$

$$\boxed{|T(s)|^2 = \frac{K^2}{s^4 + s^2 \cdot \left(2 - \frac{1}{Q^2}\right) + 1}} \quad (2)$$

# TPL4

igualo 1 y 2

$$\frac{\frac{1}{\xi^2}}{s^4+\frac{1}{\xi^2}} = \frac{K^2}{s^4+s^2\cdot\left(2-\frac{1}{Q^2}\right)+1}$$

$$K^2=\frac{1}{\xi^2} \to K=\frac{1}{\sqrt{\xi^2}} \to \boxed{K=1,965}$$

$$2-\frac{1}{Q^2}=0 \to 2=\frac{1}{Q^2} \to \boxed{Q=\frac{1}{\sqrt{2}}=0,707}$$

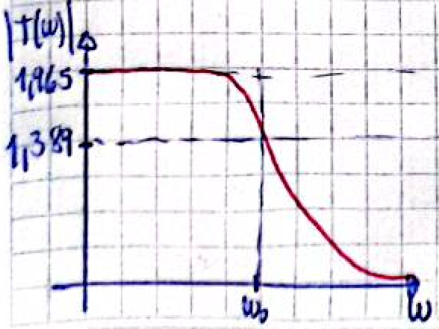
$$\therefore \to \boxed{T(s)=\frac{(-1)\cdot(1,965)}{s^2+s\cdot\frac{1}{0,707}+1}} \to \text{para un } \alpha_{max}=1dB$$

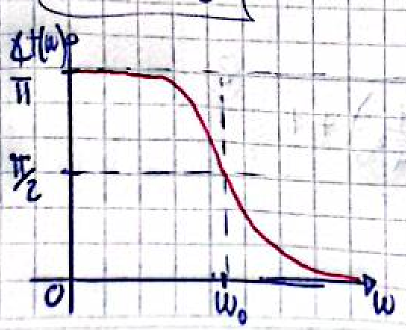
2) si $s=j\omega \to T(j\omega)=\dfrac{(-1)\cdot(1,965)}{-\omega^2+j\omega\cdot\frac{1}{0,707}+1}=\dfrac{(-1)\cdot(1,965)}{(1-\omega^2)+j\left(\frac{\omega}{0,707}\right)}$

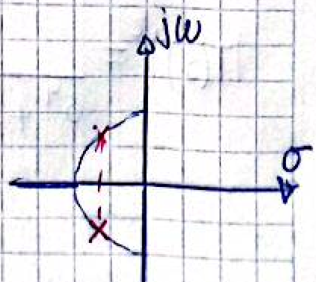
$$T(\omega)=\frac{1,965}{\sqrt{(1-\omega^2)^2+\left(\frac{\omega}{0,707}\right)^2}}\cdot\frac{e^{j\pi}}{e^{j\,\mathrm{arctg}\left(\frac{\frac{\omega}{0,707}}{(1-\omega^2)}\right)}}$$

$\boxed{|T(0)|=1,965}$ $\boxed{|T(\infty)|=0}$ esta normalizada en $\omega_0 \to \omega_0'=1$ $\boxed{|T(\omega_0')|=1,389}$

$\boxed{\measuredangle T(0)=\pi}$ $\boxed{\measuredangle T(\infty)=0}$ $\boxed{\measuredangle T(\omega_0')=\frac{\pi}{2}}$




NOTA