TPL4

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

si utilizo la aproximación de máx planicidad

$$|H(j\omega)|^2 = \frac{1}{1+\xi^2 \cdot \omega^{2n}} \rightarrow \text{si } \boxed{n=2} \rightarrow |H(\omega)|^2 = \frac{1}{1+\xi^2 \cdot \omega^4}$$

$$\boxed{|H(s)|^2 = \frac{\frac{1}{\xi^2}}{s^4 + \frac{1}{\xi^2}}} \quad (1)$$

si es un pasabajos de orden 2 y empieza en 0dB

$$|T(s)|^2 = T(s) \cdot T(-s) = \frac{b}{s^2+s.a+b} \cdot \frac{b}{s^2-s.a+b}$$

$$|T(s)|^2 = \frac{b^2}{(s^4 - \cancel{s^3 a} + s^2 b) + (\cancel{s^3 a} - s^2 a^2 + \cancel{sab}) + (s^2 b - \cancel{sab} + b^2)}$$

$$\boxed{|T(s)|^2 = \frac{b^2}{s^4 + s^2(2b-a^2) + b^2}} \quad (2)$$

igualo (1) y (2)

$$b^2 = \frac{1}{\xi^2} \rightarrow \boxed{b = 1{,}965}$$

$$(2b - a^2) = 0 \rightarrow \boxed{a = 1{,}982}$$

$$\boxed{T(s) = \frac{1{,}965}{s^2 + s.1{,}982 + 1{,}965}}$$

$\omega_0^2 = 1{,}965 \rightarrow \boxed{\omega_0' = 1{,}4}$

$\boxed{K=1}$

$1{,}982 = \frac{\omega_0}{Q} \rightarrow \boxed{Q = 0{,}7}$

2) si $T(\omega)\Big|_{s=j\omega} = \dfrac{1{,}965^2}{-\omega^2 + j\omega\, 1{,}982 + 1{,}965^2} = \dfrac{1{,}965^2}{(1{,}965^2 - \omega^2) + j\omega\, 1{,}982}$

$$T(\omega) = \frac{1{,}965^2}{\sqrt{(1{,}965^2-\omega^2)^2 + (\omega\, 1{,}982)^2}} \cdot \frac{1}{e^{j\,\mathrm{arctg}\left(\frac{\omega\, 1{,}982}{1{,}965^2-\omega^2}\right)}}$$

$\boxed{|T(0)| = 1}$ $\quad \boxed{|T(\infty)| = 0}$ $\quad \boxed{|T(\omega_0)| = 0{,}71}$

$\omega_0 = 1{,}4$

$\boxed{\measuredangle T(0) = \pi}$ $\quad \boxed{\measuredangle T(\infty) = 0}$ $\quad \boxed{\measuredangle T(\omega_0) \simeq \frac{\pi}{2}}$