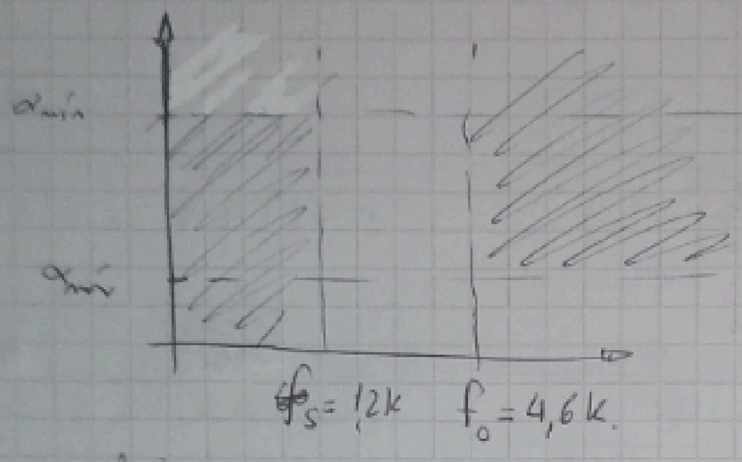
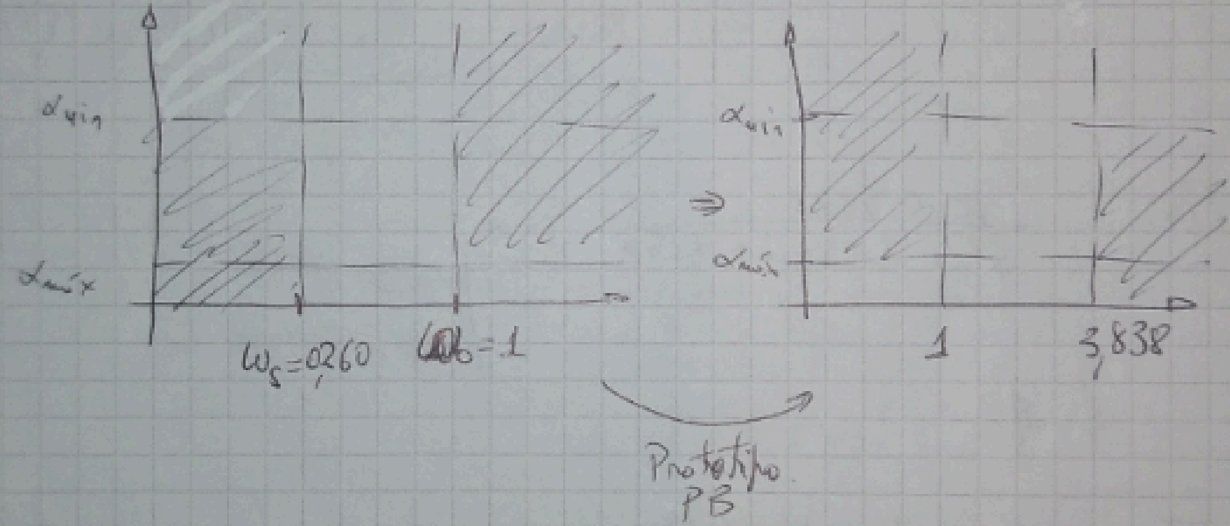


$\alpha_{max} = 1\,db$

$\alpha_{min} = 20\,db$

normalizamos



Ahora trabajamos el ε y n

$$\varepsilon^2 = 10^{\frac{\alpha_{max}}{10}} - 1 \Rightarrow \varepsilon^2 = 0,2589$$

$$n=2 \quad C_n = (2\omega_s^2 - 1) \Rightarrow \omega_s = 3,838 \Rightarrow$$

$$\alpha_{min} = 10 \log (1 + \varepsilon^2 C_n^2)$$

$$\alpha_{min} = 10 \log (1 + 0,2589 (2(3,838)^2 - 1)^2)$$

$$\boxed{\alpha_{min} = 23,236\,db}$$

el orden es 2.

luego $\left| T(\$) \right|_{\Omega = \frac{\$}{j}} = \dfrac{1}{1 + \varepsilon^2 (2\Omega_s^2 - 1)^2}$

$$T(\$)\,T(-\$) = \frac{1}{1 + \varepsilon^2 \left(2\left(\frac{\$}{j}\right)^2 - 1 \right)^2} = \frac{1}{\varepsilon^2 4\$^4 + \varepsilon^2 4\$^2 + \varepsilon^2 + 1}$$

$$T(\$)\,T(-\$) = \frac{1/4\varepsilon^2}{\$^4 + \$^2 + \frac{(\varepsilon^2 + 1)}{4\varepsilon^2}} = K \frac{0{,}9826}{\$^2 + 1{,}097\$ + 1{,}102} \cdot \frac{0{,}9826}{\$^2 - 1{,}097\$ + 1{,}102}$$

raíces: $\$_{1,2} = -0{,}5488 \pm 0{,}8951\, j$

$$T(\$) = \frac{K\, 0{,}9826}{\$^2 + 1{,}097\$ + 1{,}102}$$

~~$\omega_{01} = 1{,}049$~~
~~$Q = 0{,}956$~~

luego $\$ = \frac{1}{s}$

$$T(s) = \frac{K \cdot 0{,}9826}{\left(\frac{1}{s}\right)^2 + 1{,}097\left(\frac{1}{s}\right) + 1{,}102}$$

$$T(s) = \frac{K\, 0{,}9826\, s^2}{1 + 1{,}097 s + 1{,}102 s^2} \Rightarrow \boxed{T(s) = \frac{K\, 0{,}9826\, s^2}{s^2 + 0{,}995 s + 0{,}907}}$$