

eJ3)

$$\Delta_{MIN} = 48 \text{ dB}$$

$$f_s = 9,6 \text{ kHz}$$

$$\Delta_{MAX} = 0,4 \text{ dB}$$

$$f_p = 3,2 \text{ kHz}$$

$$\epsilon^2 = 10^{\frac{\Delta_{MAX}}{10}} - 1 = 0,096$$

$$\Delta_{MIN} = 10 \log [1 + \epsilon^2 \cosh(n \cosh^{-1}(\omega_s))] \Big|_{\omega_p}$$

Itero y quedo $n = 5$

$$|T_c(\omega)|^2 = \frac{1}{1 + \epsilon^2 C_5^2(\omega)}$$

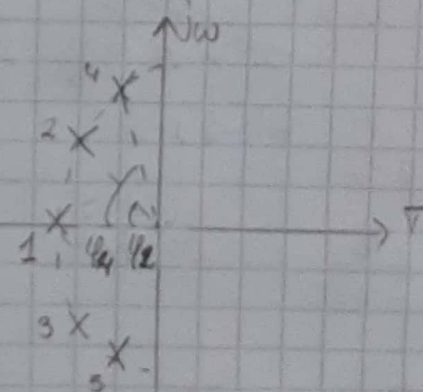
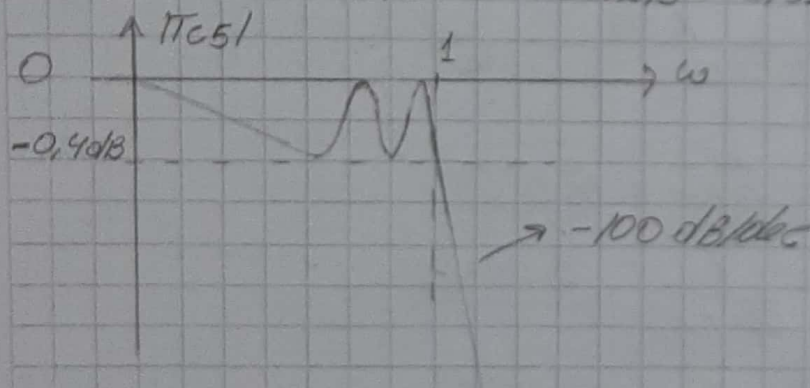
$$T_{C5}(5) = \frac{0,2}{5^5 + 5^4 \cdot 1,25 + 5^3 \cdot 2,03 + 5^2 \cdot 1,43 + 5 \cdot 0,32 + 0,2}$$

← con Python

Polos: $P_1 = -0,386$

$P_{2,3} = -0,312 \pm j0,63$

$P_{4,5} = -0,12 \pm j1,02$



NOTA [15:00] → [16:00] [16:25] → [16:50]

$$\tan \varphi_2 = \frac{0,63}{0,312} = 1,11 \text{ rad/s}$$

$$Q_2 = \frac{1}{2 \cos \varphi_2} = 1,12$$

$$\tan \varphi_4 = \frac{1,02}{0,12} = 1,45 \text{ rad/s}$$

$$Q_4 = \frac{1}{2 \cos \varphi_4} = 4,15$$

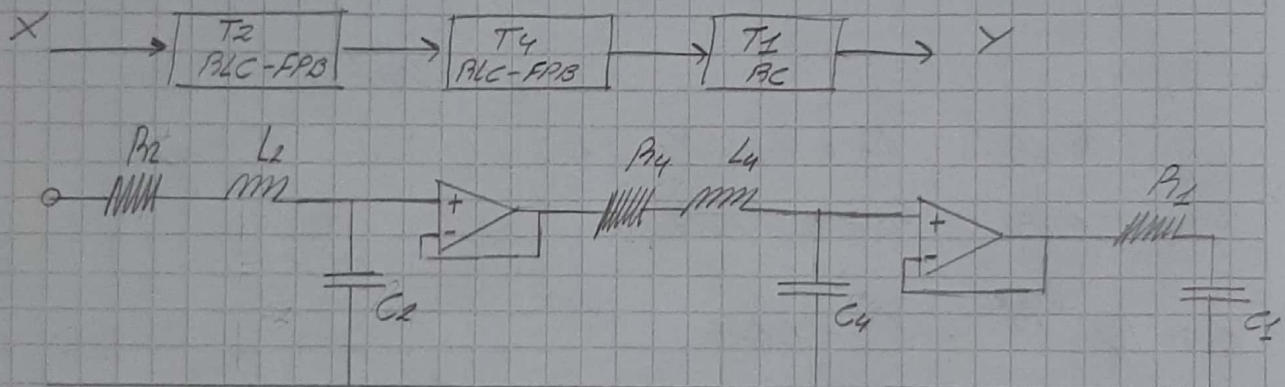
$$\omega_{02} = \sqrt{0,312^2 + 0,63^2} = 0,7 \text{ rad/s}$$

$$\omega_{04} = \sqrt{0,12^2 + 1,02^2} = 1,03 \text{ rad/s}$$

$$\Rightarrow |T_{CS}(s)| = \frac{\omega_{02}}{s + \omega_{02}} \cdot \frac{\omega_{02}^2}{s^2 + 5 \frac{\omega_{02}^2}{Q_2} + \omega_{02}^2} \cdot \frac{\omega_{04}^2}{s^2 + 5 \frac{\omega_{04}^2}{Q_4} + \omega_{04}^2}$$

$$|T_{CS}(s)| = \frac{0,386}{s + 0,386} \cdot \frac{0,49}{s^2 + 5 \cdot 0,625 + 0,49} \cdot \frac{1,06}{s^2 + 5 \cdot 0,248 + 1,06}$$

$\frac{0,386}{s + 0,386} \quad \frac{0,49}{s^2 + 5 \cdot 0,625 + 0,49} \quad \frac{1,06}{s^2 + 5 \cdot 0,248 + 1,06}$
 $T_1 \quad T_2 \quad T_4$



$$T_2(s) = \frac{1/L_2 C_2}{s^2 + 5 R_2/L_2 + 1/L_2 C_2} = \frac{0,49}{s^2 + 5 \cdot 0,625 + 0,49}$$

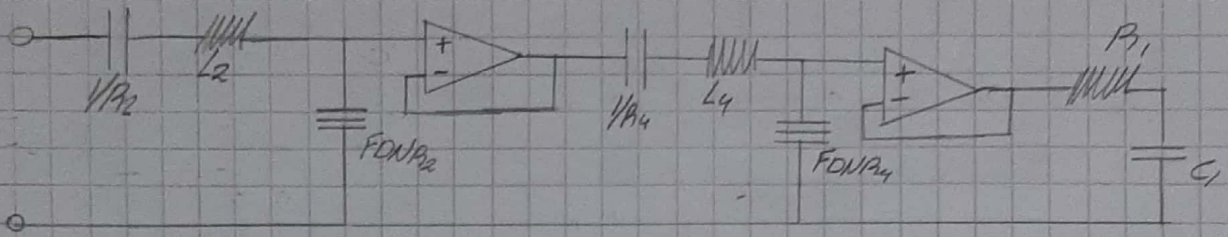
$$\begin{cases} \frac{1}{L_2 C_2} = 0,49 \\ \frac{R_2}{L_2} = 0,625 \end{cases} \Rightarrow \begin{cases} R_2 = R_4 = R_1 = R_Z \Rightarrow R = 1 \\ L_2 = \frac{1}{0,625} = 1,6 \\ C_2 = \frac{1}{62 \cdot 0,49} = 1,275 \end{cases}$$

$$T_4(s) = \frac{1/L_4 C_4}{s^2 + 5 R_4/L_4 + 1/L_4 C_4} = \frac{1,06}{s^2 + 5 \cdot 0,248 + 1,06}$$

$$\begin{cases} \frac{1}{L_4 C_4} = 1,06 \\ \frac{R_4}{L_4} = 0,248 \end{cases} \Rightarrow \begin{cases} L_4 = \frac{1}{0,248} = 4,03 \\ C_4 = \frac{1}{L_4 \cdot 1,06} = 0,284 \end{cases}$$

$$T_1 = \frac{1/R_1 C_1}{s + 1/R_1 C_1} = \frac{0,386}{s + 0,386} \Rightarrow \begin{cases} \frac{1}{C_1} = 0,386 \\ C_1 = 2,59 \end{cases}$$

Bruton 1/5

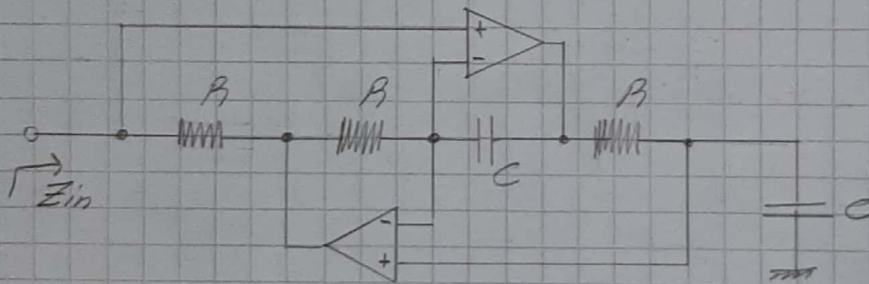


Grac como FONP $\rightarrow Z_{i_{onc}} = \frac{Z_1 Z_3 Z_5}{Z_2 Z_4}$

$Z_{1,2,4} = R$ y $Z_{3,5} = \frac{1}{sC}$

$\Rightarrow D = AC^2$

$Z_{i_{FONP}} = \frac{1}{s^2 AC^2 D}$



$Z_{in2} = \frac{1}{s^2 D_2}$ $D_2 = R_2' C_2'^2 = C_2 = 1,275$

$R_2' = 1$ y $C_2' = \sqrt{C_2}$

$Z_{in4} = \frac{1}{s^2 D_4}$

$D_4 = R_4' C_4'^2 = C_4 = 0,284$

$R_4' = 1 \Rightarrow C_4' = \sqrt{C_4}$

$C_2 = D_2$?