Tp Laboratorio

viernes, 24 de junio de 2022   1:36 p. m.

Ecuaciones de diseño

$$\omega_n^2 = \frac{\cancel{R_2}}{\cancel{R_1} R_{F1} R_{F2} C_1 C_2}$$

$$Q = \frac{1 + \dfrac{R_4 (R_G + R_Q)}{R_G R_Q}}{1 + \dfrac{R_2}{R_1}} \left[\frac{R_2 R_{F1} C_1}{R_1 R_{F2} C_2} \right]^{1/2}$$

$$A_{HP} = \frac{R_2}{R_1} \qquad A_{LP} = \frac{1 + \dfrac{R_2}{R_1}}{R_G \left[\dfrac{1}{R_G} + \dfrac{1}{R_Q} + \dfrac{1}{R_4} \right]}$$

$$\Omega_Z = 50K \qquad\qquad \Omega_w = 2\pi \cdot 4600$$

$$R_N = \frac{R}{\Omega_Z}$$

$$T(s) = 0,89 \cdot \frac{s^2}{s^2 + s \cdot 0,996 + 0,907}$$

$$C_N = C \cdot \Omega_Z \cdot \Omega_w$$

$$C_N = 1000 \times 10^{-12} \cdot 50K \cdot 2\pi \cdot 4600$$

$$\omega_{o_N}^2 = 0,907$$

$$C_N = \pi \cdot 23/50$$

$$Q = \frac{\sqrt{0,907}}{0,996} \rightarrow Q = 0,9562$$

TRABAJO NORMALIZADO

$$R_F = R_{F1} = R_{F2} \qquad\qquad C_1 = C_2 = C$$

$$\omega_N^2 = \frac{1}{R_F^2 \cdot C^2} \rightarrow R_{F_N} = \frac{1}{C_N} \cdot \frac{1}{\sqrt{\omega_N}} \rightarrow R_{F_N} = 0,72659$$

$$Q = \frac{1 + \dfrac{R_4 (R_G + R_Q)}{R_G R_Q}}{1 + \dfrac{\cancel{R_2}}{\cancel{R_1}}} \left[\frac{R_2 \cancel{R_{F1}} C_1}{\cancel{R_1} R_{F2} C_2} \right]^{1/2} \Rightarrow Q = \frac{1 + \dfrac{1}{R_{G_N} // R_{Q_N}}}{2} \rightarrow \frac{1}{R_{G_N} // R_{Q_N}} = 2Q - 1$$

$$R_{G_N} // R_{Q_N} = \frac{1}{2Q - 1} = \frac{1}{2 \cdot 0,9562 - 1}$$

$$R_{G_N} // R_{Q_N} \approx 1,096 = R_T = y$$

$$A_{HP} = \frac{R_2}{R_1} \qquad A_{LP} = \frac{1 + \dfrac{R_2}{R_1}}{R_G \left[\dfrac{1}{R_G} + \dfrac{1}{R_Q} + \dfrac{1}{R_4} \right]} \rightarrow A_{HP} = \frac{2}{R_{G_N} \left(\dfrac{1}{R_{G_N} // R_{Q_N}} + 1 \right)} \rightarrow R_{G_N} = \frac{2}{A_{HP} \left(\dfrac{1}{R_{G_N} // R_{Q_N}} + 1 \right)}$$

$$R_{G_N} = \frac{2}{0,89 \left(\dfrac{1}{1,0748} + 1 \right)} \rightarrow R_{G_N} = 1,175 = M$$

$$R_{Q_N} = \frac{R_{G_N} \cdot R_T}{R_{G_N} - R_T} = \frac{M \cdot y}{} = 16,29142$$

DESNORMALIZACIÓN

$$R_F = R_{F_N} \cdot \Omega_Z = 0,72659 \cdot 50K \rightarrow R_F = 36329,5 \, \Omega$$

$$R_G = R_{G_N} \cdot \Omega_Z = 1,175 \cdot 50K \rightarrow R_G = 58750 \, \Omega$$

$$R_Q = R_{Q_N} \cdot \Omega_Z = 16,29142 \cdot 50K \rightarrow R_Q = 814571 \, \Omega$$

$$C = \frac{C_N}{\Omega_Z \cdot \Omega_w} = 1000 \, pF$$

$$R = \Omega_Z = 50K$$