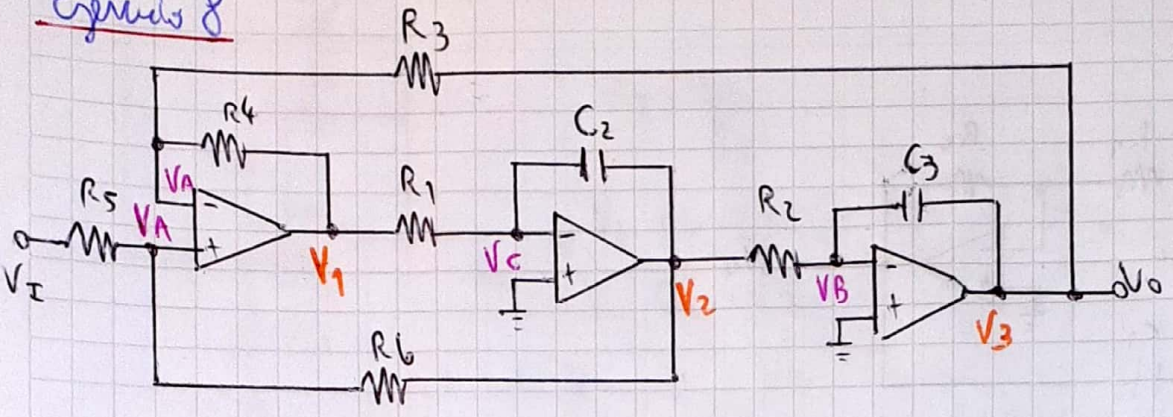
Ejercicio 8



$$\begin{cases} V_A\cdot(G_5+G_6) - V_I\cdot G_5 - V_2\cdot G_6 = 0 \\ V_A\cdot(G_4+G_3) - V_0\cdot G_3 - V_1\cdot G_4 = 0 \end{cases}$$

$$V_C^{=0}\cdot(G_1+sC_2) - G_1\cdot V_1 - sC_2\cdot V_2 = 0 \rightarrow V_2 = -V_1\cdot\frac{G_1}{sC_2}$$

$$V_B^{=0}\cdot(G_2+sC_3) - G_2\cdot V_2 - sC_3\cdot V_3 = 0 \rightarrow V_3 = -\frac{G_2}{sC_3}\cdot V_2$$

$$\begin{cases} V_A\cdot(G_5+G_6) - V_I\cdot G_5 + V_1\cdot\frac{G_1\cdot G_6}{sC_2} = 0 \\ V_A\cdot(G_4+G_3) - \frac{G_2}{sC_3}\cdot\frac{G_1}{sC_2}V_1\cdot G_3 - V_1\cdot G_4 = 0 \end{cases}$$

$$\begin{cases} V_A = \dfrac{V_I G_5 + V_1\frac{G_1}{sC_2}\cdot G_6}{G_5+G_6} \\ V_A = \dfrac{V_1\left(G_3\frac{G_2}{sC_3}\cdot\frac{G_1}{sC_2} + G_4\right)}{G_4+G_3} \end{cases}$$

$$\frac{V_I G_5 + V_1\frac{G_1}{sC_2}\cdot G_6}{G_5+G_6} = V_1\frac{\left(G_3\frac{G_2}{sC_3}\cdot\frac{G_1}{sC_2}+G_4\right)}{G_4+G_3}$$

$$V_I\frac{G_5}{G_5+G_6} = V_1\left[\frac{G_3\frac{G_2}{sC_3}\frac{G_1}{sC_2}+G_4}{G_4+G_3} - \frac{\frac{G_1}{sC_2}\cdot G_6}{G_5+G_6}\right]$$

$$\frac{V_I}{V_1}\frac{G_5}{\cancel{G_5+G_6}} = \frac{(G_5+G_6)\left(G_3\frac{G_2}{sC_3}\frac{G_1}{sC_2}+G_4\right) - (G_4+G_3)\left(+\frac{G_1}{sC_2}\cdot G_6\right)}{(G_4+G_3)\ \cancel{(G_5+G_6)}}$$

$$\frac{V_I}{V_1}\cdot G_5 = \frac{G_4(G_5+G_4) + (G_5+G_6)\left(G_3\frac{G_2}{sC_3}\frac{G_1}{sC_2}\right) - (G_4+G_3)\frac{G_1}{sC_2}\cdot G_6}{(G_4+G_3)}$$

$$\frac{V_1}{V_I} = G_5 \cdot \frac{s^2 (G_4 + G_3)}{s^2 G_4 (G_5 + G_4) + \frac{G_1 G_2 G_3}{C_2 C_3} \cdot (G_5 + G_6) - s \frac{G_1 G_6}{C_2} \cdot (G_3 + G_4)}$$

a) $$\frac{V_1}{V_I} = \frac{s^2 \frac{G_5 (G_4 + G_3)}{G_4 (G_5 + G_4)}}{s^2 - s \frac{G_1 G_6}{G_4 C_2} \cdot \frac{(G_3 + G_4)}{G_5 + G_6} + \frac{G_1 G_2 G_3}{C_2 C_3 \cdot G_4}}$$

Es un pasa-altos

b) $$\frac{V_2}{V_I} = \frac{V_1}{V_I} \cdot \left(\frac{-G_1}{sC_2}\right) = \left(\frac{-G_1}{C_2}\right) \frac{\cdot s \frac{G_5 (G_4 + G_3)}{G_4 (G_5 + G_4)}}{s^2 - s \frac{G_1 G_6}{G_4 C_2} \frac{(G_3 + G_4)}{G_5 + G_6} + \frac{G_1 G_2 G_3}{C_2 C_3 G_4}}$$

Es un pasa-banda

c) $$\frac{V_3}{V_I} = \frac{V_2}{V_I} \cdot \left(\frac{-G_2}{sC_3}\right) = \frac{G_1 G_2}{C_2 C_3} \frac{\frac{G_5 (G_4 + G_3)}{G_4 (G_5 + G_4)}}{s^2 - s \frac{G_1 G_6}{G_4 C_2} \frac{(G_3 + G_4)}{G_5 + G_6} + \frac{G_1 G_2 G_3}{C_2 C_3 G_4}}$$

Es un pasa-bajos