

$$Z(s) = \frac{(s^2 + s + 1)}{(s^2 + 2s + 5)(s + 1)}$$

La clave está en, el siempre eliminar el componente reactivo antes del resistivo, ya que, de otra manera se podría remover un valor finito más grande de lo necesario y hacer que la inmitancia deje de ser PPR.

$$Y_2 = \frac{1}{Z} - sK_{\infty} \quad \text{El cap representa el polo en infinito}$$

$$K_{\infty} = \lim_{s \rightarrow \infty} \frac{1}{Z(s) \cdot s} = \frac{(s^2 + 2s + 5)(s + 1)}{(s^2 + s + 1)s} = 1$$

$$\Rightarrow K_{\infty} = 1$$

$$Y_2 = \frac{s^3 + 3s^2 + 7s + 5}{s^2 + s + 1} - (s^3 + s^2 + s)$$

$$Y_2 = \frac{2s^2 + 6s + 5}{s^2 + s + 1}$$

$$Y_4 = Y_2 - \frac{1}{P_1} \quad \lim_{s \rightarrow \infty} Y_2 = 2$$

$$Y_4 = \frac{2s^2 + 6s + 5}{s^2 + s + 1} - 2 = \frac{4s + 3}{s^2 + s + 1}$$

$$Z_4 = \frac{1}{Y_4} = \frac{s^2 + s + 1}{4s + 3}$$

$$Z_6 = Z_4 - sK_{\infty L_1}$$

$$K_{\infty L_1} = \lim_{s \rightarrow \infty} \frac{Z_4}{s} = \frac{s^2 + s + 1}{4s^2 + 3s}$$

$$Z_6 = Z_4 - \frac{1}{4}s$$

$$K_{\infty L_1} = \frac{1}{4}$$

$$Z_6 = \frac{s^2 + s + 1}{4s + 3} - \frac{1}{4}s = \frac{4s + 3}{4s + 3}$$

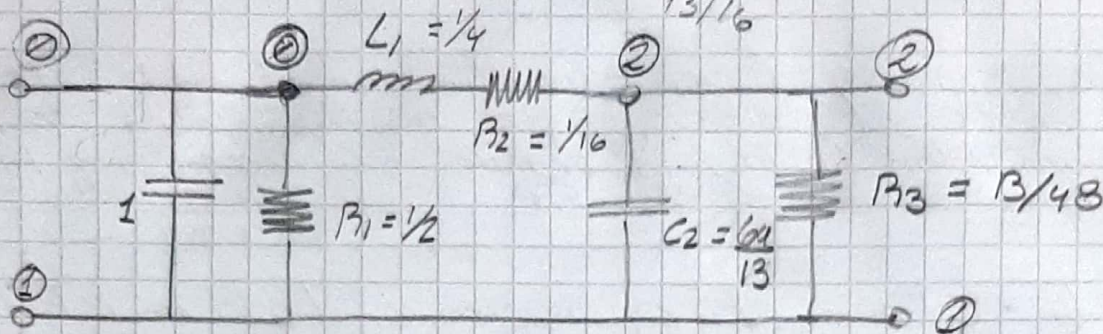
$$Z_8 = Z_6 - R_2 \quad R_2 = \lim_{s \rightarrow \infty} Z_6 = 1/16$$

$$Z_8 = \frac{1/4 s + 1 - 1/16 (4s + 3)}{4s + 3} = \frac{13/16}{4s + 3}$$

$$Y_8 = \frac{4s + 3}{13/16} ; Y_{10} = Y_8 - s R_{\infty c_2}$$

$$R_{\infty c_2} = \lim_{s \rightarrow \infty} \frac{4s + 3}{s \cdot 13/16} = \frac{64}{13}$$

$$\Rightarrow Y_{10} = Y_{P3} = \frac{4s + 3}{13/16} - \frac{13/16 \cdot 64/13 s}{13/16} = \frac{3}{13/16} = \frac{48}{13}$$



Verifico con NAI en python

$$Y_{NAI} = \begin{pmatrix} sC_1 + G_1 + \frac{1}{sL_1 + R_2} & -(sC_1 + G_1) & -\frac{1}{sL_1 + R_2} \\ -(sC_1 + G_1) & sC_1 + G_1 + sC_2 + G_3 & -(sC_2 + G_3) \\ -\frac{1}{sL_1 + R_2} & -(sC_2 + G_3) & \frac{1}{sL_1 + R_2} + sC_2 + G_3 \end{pmatrix}$$

$$T = \begin{pmatrix} 1 & 0 \\ sC_1 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 \\ G_1 & 1 \end{pmatrix} \begin{pmatrix} 1 & sL_1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & R_2 \\ 0 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 \\ sC_2 & 1 \end{pmatrix}$$

$$\cdot \begin{pmatrix} 1 & 0 \\ G_3 & 1 \end{pmatrix} = \begin{pmatrix} A & B \\ C & D \end{pmatrix} ; A = \left. \frac{V_1}{V_2} \right|_{I_2=0} \text{ y } C = \left. \frac{I_1}{V_2} \right|_{I_2=0}$$

$$Z_i = \frac{A}{C} = \frac{V_1}{V_2} \cdot \frac{V_2}{I_1} \bigg|_{I_2=0} = \frac{V_1}{I_1}$$