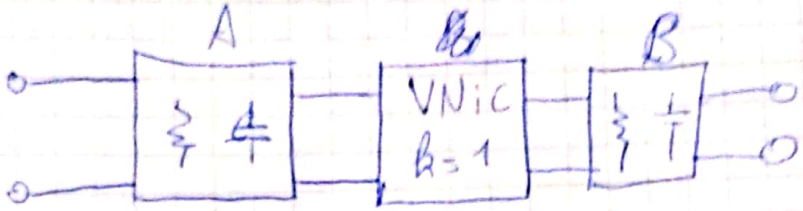
# Síntesis de funciones activas

## Tarea semanal 11




$$\begin{pmatrix} V_1 \\ I_1 \end{pmatrix} = \begin{pmatrix} A & B \\ C & D \end{pmatrix} \begin{pmatrix} V_2 \\ -I_2 \end{pmatrix} \rightarrow \begin{pmatrix} -k^{-1} & 0 \\ 0 & -1 \end{pmatrix} \rightarrow T \text{ de VNIC}$$

$$T_X = \begin{pmatrix} A_A & B_A \\ C_A & D_A \end{pmatrix} \begin{pmatrix} -k & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} A_B & B_B \\ C_B & D_B \end{pmatrix}$$

$$\left.\frac{V_2}{I_1}\right|_{I_2=0} = \frac{1}{C_X}$$

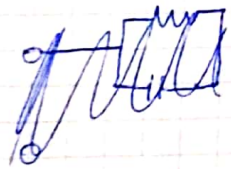
$$T_X = \begin{pmatrix} -k^{-1}A_A & B_A \\ -k^{-1}C_A & D_A \end{pmatrix} \begin{pmatrix} A_B & B_B \\ C_B & D_B \end{pmatrix} \rightarrow C_X = -k^{-1}A_A A_B + D_A C_B$$

$$C_X = k^{-1}\frac{Z_{22A}}{Z_{21A}}\cdot\frac{1}{Z_{21B}} - \frac{1}{Z_{21A}}\cdot\frac{Z_{11B}}{Z_{21B}}$$

$$\frac{1}{C_X} = \frac{Z_{21A}\,Z_{21B}}{k^{-1}Z_{22A} - Z_{11B}}$$

$$\left.\frac{V_2}{I_1}\right|_{I_2=0} = \frac{k\,Z_{21A}\,Z_{21B}}{Z_{22A} - k\,Z_{11B}}$$

b)



$$F(s) = \frac{1}{(s+1)(s^2+s+1)} = \frac{N(s)}{D(s)}$$

$Q(s) = s(s+\frac{1}{2})(s+2)$ → arbitrario $(G_\pi(Q) = G_\pi(D))$

$$\frac{D(s)}{Q(s)} = K_0 + \frac{K_1}{s} + \frac{K_2}{s+\frac{1}{2}} + \frac{K_3}{s+2} = \frac{(s+1)(s^2+s+1)}{s(s+\frac{1}{2})(s+2)}$$

$$K_0 = \lim_{s\to\infty} = 1$$

$$K_1 = \lim_{s\to 0} s\,\frac{D(s)}{Q(s)} = 1$$

$$K_2 = \lim_{s\to -\frac{1}{2}} (s+\tfrac{1}{2})\frac{D(s)}{Q(s)} = -\tfrac{1}{2}$$

$$K_3 = \lim_{s\to(-2)} (s+2)\,\frac{D(s)}{Q(s)} = -1$$

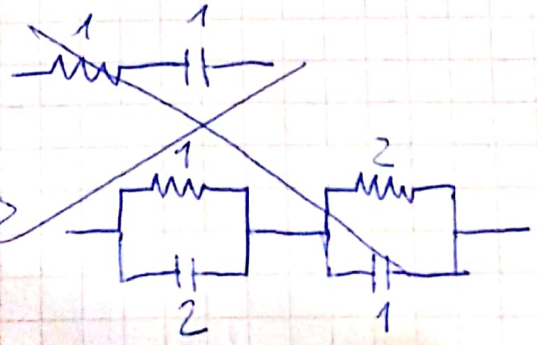
} $z_{22A}$

} $z_{11B}$ (porque con (-))

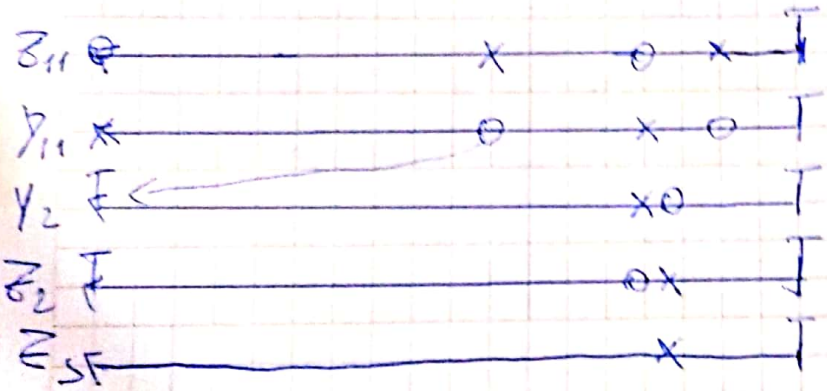
$$z_{22A} = 1 + \frac{1}{s}$$

$$z_{11B} = \underbrace{\frac{1/2}{s+1/2}}_{=\frac{1}{2s+1}} + \frac{1}{s+2}$$

→



$$Z_{11B} = \frac{1,5(s+1)}{(s+2)(s+1/2)} = \frac{1,5s+1,5}{s^2+s\frac{5}{2}+1} \qquad Z_{21B} = \frac{K}{(s+\frac{1}{2})(s+2)}$$

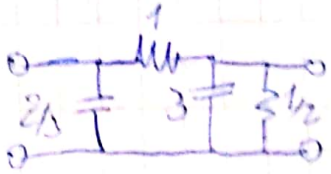



$$s^2+s\frac{5}{2}+1 \;\Big|\; 1,5s+1,5 \qquad \frac{2}{3}s \rightarrow C \quad \frac{1}{\frac{2}{3}} = \frac{3}{2}$$

$$1,5s+1,5 \;\Big|\; \frac{3}{2}s+1 \qquad 1 \rightarrow R$$

$$\frac{3}{2}s+1 \;\Big|\; \frac{1}{2} \qquad 3s \rightarrow \frac{1}{3s}$$

$$\frac{1}{2} \;\Big|\; 1 \qquad \frac{1}{2} \rightarrow \frac{1}{0,5}$$




$$Z_{22A} = 1 + \frac{1}{s} \qquad Z_{21A} = \frac{1}{s}$$