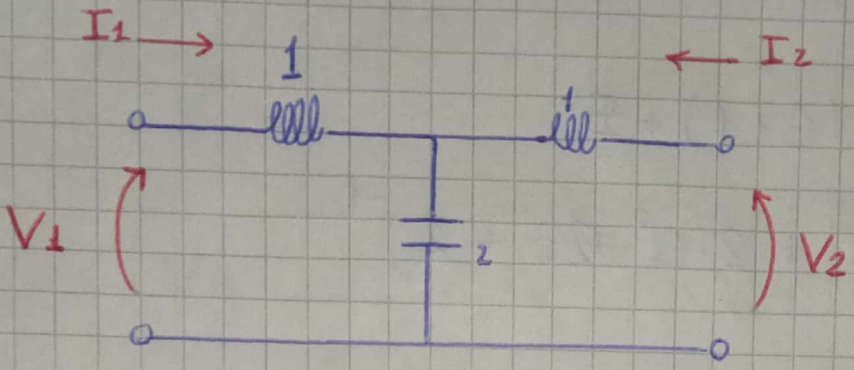
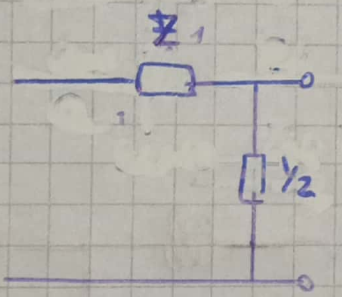
TS14

Calcular los parametros S de:



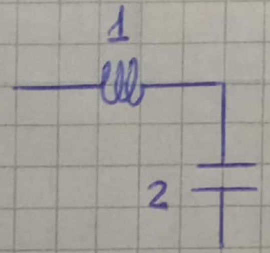
$$\begin{cases} b_1 = S_{11}\cdot a_1 + S_{12}\cdot a_2 \\ b_2 = S_{21}\cdot a_1 + S_{22}\cdot a_2 \end{cases}$$

$T_1 =$



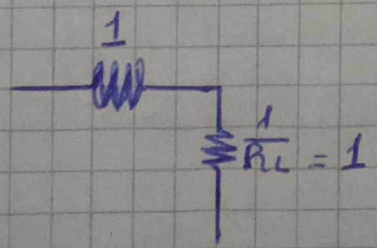
$$T = \begin{pmatrix} 1 + Z_1\cdot\frac{1}{Y_2} & Z_1 \\ \frac{1}{Y_2} & 1 \end{pmatrix}$$

T_1



$$\begin{pmatrix} 1 + S^2\cdot 2 & S \\ 2\cdot S & 1 \end{pmatrix}$$

T_2



$$\begin{pmatrix} 1 + S & S \\ 1 & 1 \end{pmatrix}$$

$$T = T_1 \cdot T_2$$

$$T = \begin{pmatrix} 2 \cdot s^2 + 1 & s \\ 2 \cdot s & 1 \end{pmatrix} \begin{pmatrix} s+1 & s \\ 1 & 1 \end{pmatrix}$$

$$A_T = (2 \cdot s^2 + 1)(s+1) + s$$

$$A_T^{-1} = \frac{V_2}{V_1} = (2 \cdot s^3 + 2 \cdot s^2 + 2s + 1)^{-1}$$

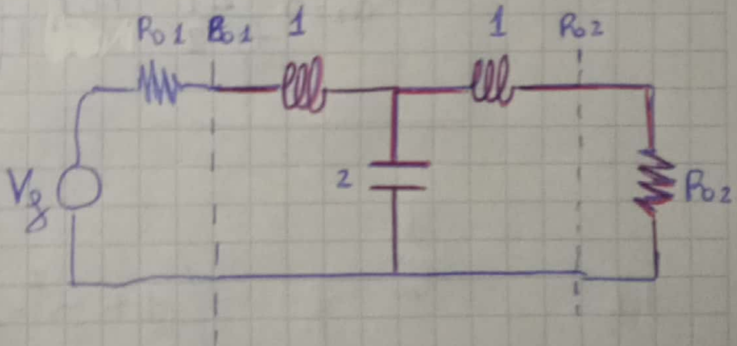
$$T(s) = \frac{1}{2 \cdot s^3 + 2 \cdot s^2 + 2s + 1}$$

↳ $S_{11} = \dfrac{Z_1 - R_{o1}}{Z_1 + R_{o1}}$

↳ $S_{21} = \dfrac{V_2}{(V_{g1}/2)} \sqrt{\dfrac{R_{o2}}{R_{o1}}}$

↳ $S_{12} = \dfrac{V_1}{(V_{g2}/2)} \sqrt{\dfrac{R_{o1}}{R_{o2}}}$

↳ $S_{22} = \dfrac{Z_2 - R_{o2}}{Z_2 + R_{o2}}$



$R_{o1} = R_{o2} = 1$

• Busco $Z1$

$$Z_1 = s + \left[(s+1) \,//\, \frac{1}{2s} \right]$$

$$Z_1 = \left(\frac{1}{s+1} + 2 \cdot s \right)^{-1} + s =$$

- $Z_1 = \dfrac{2\cdot s^3 + 2\cdot s^2 + 2\cdot s + 1}{2\cdot s^2 + 2\cdot s + 1}$

- Busco V_{gs}

↳ $V_1 = V_g \dfrac{Z_1}{Z_1 + 1}$

$$\frac{V_1}{V_g} = \frac{2\cdot s^3 + 2\cdot s^2 + 2\cdot s + 1}{2 s^3 + 4 s^2 + 4\cdot s + 2}$$

$$\frac{V_1}{(V_g/2)} = \frac{2\cdot s^3 + 2\cdot s^2 + 2\cdot s + 1}{s^3 + 2\cdot s^2 + 2\cdot s + 1}$$

$$S_{11} = \frac{\left(\frac{2\cdot s^3 + 2\cdot s^2 + 2\cdot s + 1}{2\cdot s^2 + 2s + 1}\right)}{\left(\frac{2\cdot s^3 + 2\cdot s^2 + 2\cdot s + 1}{2\cdot s^2 + 2\cdot s + 1}\right) + 1}$$

$S_{11} = S_{22}$ y $S_{21} = S_{12}$ => por paridad

$$S_{11} = \frac{s^3}{s^3 + 2\cdot s^2 + 2\cdot s + 1}$$

$$S_{21} = \frac{V_2}{(V_g/2)} = \frac{V_2}{V_1} \frac{V_1}{(V_{gs}/2)} =$$

$$S_{21} = S_{12} = \frac{1}{\cancel{2\cdot S^3 + 2\cdot S^2 + 2\cdot S + 1}} \cdot \frac{\cancel{2\cdot S^3 + 2\cdot S^2 \cdot 2\cdot S + 1}}{\cdot S^3 + 2\cdot S^2 + 2s^2 + 1}$$

Finalmente

$$S_{11} = S_{22} = \frac{S^3}{S^3 + 2\cdot S^2 + 2\cdot S + 1}$$

$$S_{12} = S_{21} = \frac{1}{S^3 + 2\cdot S^2 + 2\cdot S + 1}$$

Siendo S_{11} y S_{22} el coeficiente de reflexion

Siendo S_{12} y S_{21} los coef de transmicion

↳ si $\omega \to 0$, S_{12} y $S_{21} = 1$, se ve la maxima transmicion de potencia (en la banda de paso)
si $\omega \to 0$, el coeficiente de reflexion sera nulo, estara totalmente adaptada (no refleja)

↳ si $\omega \to \infty$, S_{12} y $S_{21} = 0$, no hay transferencia de energia
si $\omega \to \infty$, S_{11} y $S_{22} = 1$, esta totalmente desadaptada refleja toda la potencia

↳ Si $W \to 1$, $S_{11} = S_{12} = S_{21} = S_{22}$ es la frecuencia de corte, por lo tanto hay tanto onda transmitida como reflejada

Escaneado con CamScanner