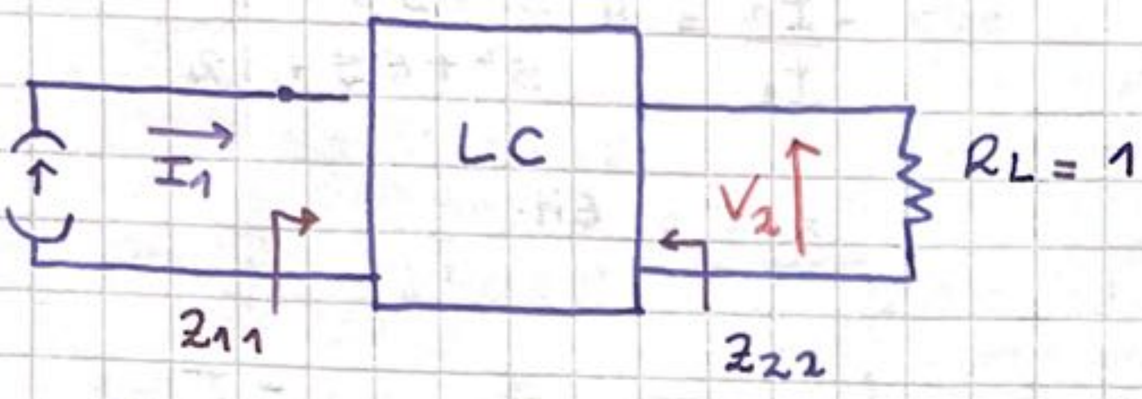
Resolución:

* Importante: Asumimos que z_{21} siempre es impar.

② $T(s) = \frac{V_2}{I_1} = \frac{s^2+9}{s^3+2s^2+2s+1}$ | $I_2 = 0$.



Recordamos los parámetros:

z/ $V_1 = I_1 z_{11} + I_2 z_{12}$

$V_2 = I_1 z_{21} + I_2 z_{22} \rightarrow \frac{V_2}{I_1} = z_{21}$

Sabemos que:

$$\frac{V_L}{I_1} = \frac{V_2}{I_1} \cdot \frac{V_L}{V_2} \rightarrow \frac{V_L}{V_2} = \frac{R_L}{R_L + z_{22}} = \frac{1}{1 + \frac{z_{22}}{R_L}}$$

$$\frac{V_L}{I_1} = \frac{V_2}{I_1} \cdot \frac{1}{1+z_{22}} = \frac{z_{21}}{1+z_{22}}$$

* Como $z_{21} = \frac{s^2+9}{s^3+2s^2+2s+1} = \frac{M}{N}$, entonces:

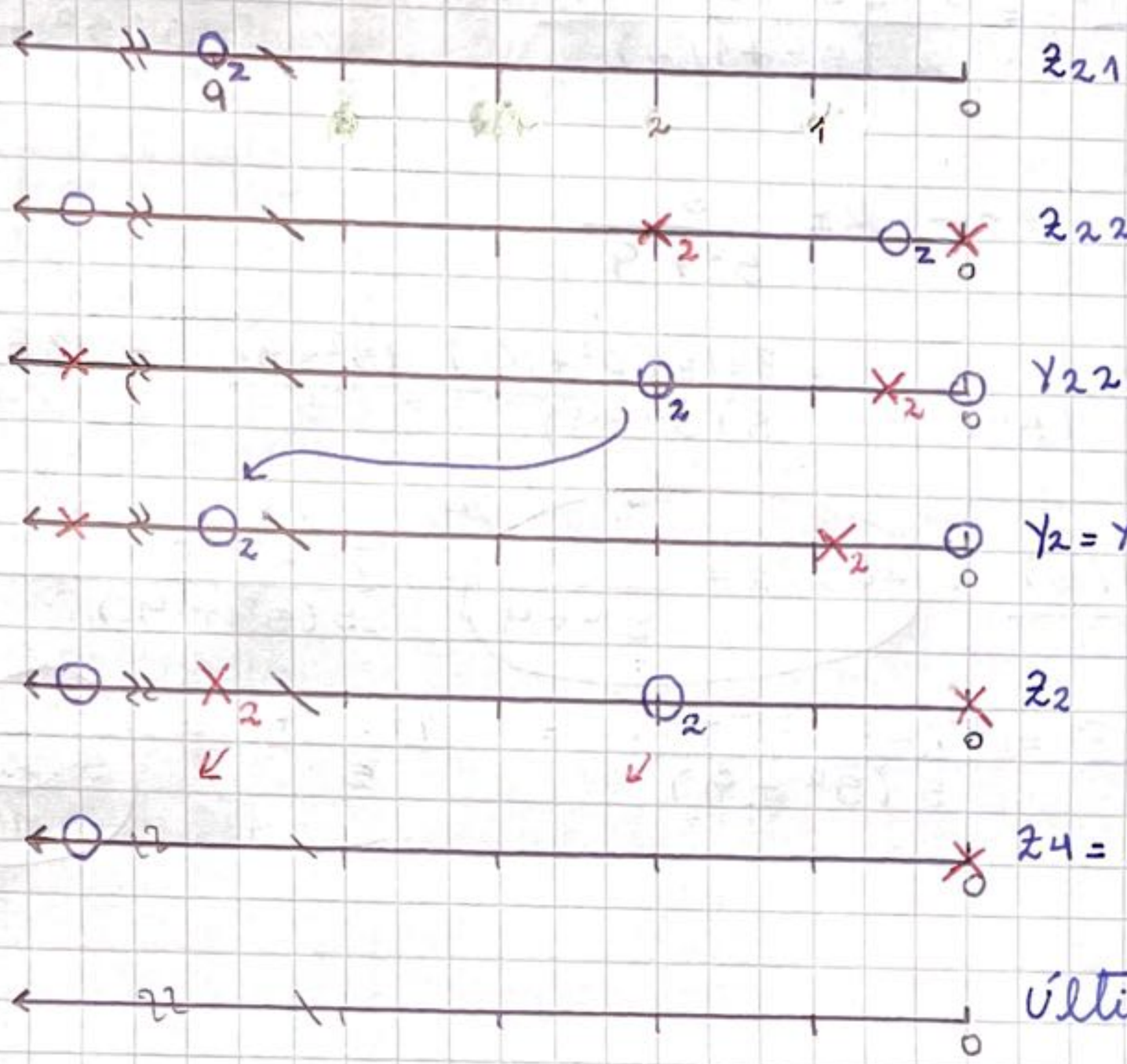
$$z_{22} = \frac{M}{N} = \frac{2s^2+1}{s^3+2s}$$

Luego, a partir de z_{22} podemos realizar la síntesis de la función transferencia:

$$z_{22} = 2\,\frac{(s^2+1/2)}{s(s^2+2)}$$

NOTA

· Síntesis gráfica ·



Remociones:

I) C en Y.

II) LC// en Z.

III) C en Z. → Lo ubicamos en derivación (Y) por la condición de medición ($I_2 = 0$).

Síntesis Analítica:

$$Z_{22} = \frac{2\,(s^2 + 1/2)}{s\,(s^2 + 2)} \longrightarrow Y_{22} = \frac{1}{2}\,\frac{(s^2+2).s}{(s^2+1/2)}$$

* $Y_2 = Y_{22} - Y_1 = Y_{22} - K_I.s$

NOTA

• $K1 = Y_{22} \cdot \frac{1}{s}\Big|_{s^2=-9} = \frac{1}{2}\frac{s(s^2+2)}{(s^2+1/2)} \cdot \frac{1}{s} = \frac{7}{17}$

↓

$Y_2 = Y_{22} - \frac{7}{17}s = \frac{s(s^2+2)\ldots}{2(s^2+1/2)2} - \frac{7}{17}s = \frac{s^3+2s-{}^{14}/_{17}s^3-{}^{7}/_{17}s}{2(s^2+1/2)}$ (Y=)

$Y_2 = \frac{{}^{3}/_{17}s^3+{}^{27}/_{17}s}{2(s^2+1/2)} = \frac{{}^{3}/_{17}s(s^2+9)}{2(s^2+1/2)} \longrightarrow Z_2 = \frac{{}^{34}/_{3}(s^2+1/2)}{s(s^2+9)}$

* $Z_4 = Z_2 - Z_3 = Z_2 - K_{II}\frac{s}{s^2+9}$

• $K_{II} = Z_2 \cdot \frac{s^2+9}{s}\Big|_{s^2=-9} = \frac{{}^{34}/_{3}(s^2+1/2)}{s(s^2+9)} \cdot \frac{(s^2+9)}{s} = \frac{289}{27}$

↓

$Z_4 = \frac{{}^{34}/_{3}(s^2+1/2)}{s(s^2+9)} - \frac{289/27\ s}{s^2+9} = \frac{{}^{34}/_{3}s^2+{}^{17}/_{3}-{}^{289}/_{27}s^2}{s(s^2+9)}$ (Z=)

$Z_4 = \frac{{}^{17}/_{27}s^2+{}^{17}/_{3}}{s(s^2+9)} = \frac{{}^{17}/_{27}(s^2+9)}{s(s^2+9)} = \frac{{}^{17}/_{27}}{s} = \frac{1}{s\cdot\frac{27}{17}}$ (Y=)

En tonces:

• $C_1 = 7/17$ F

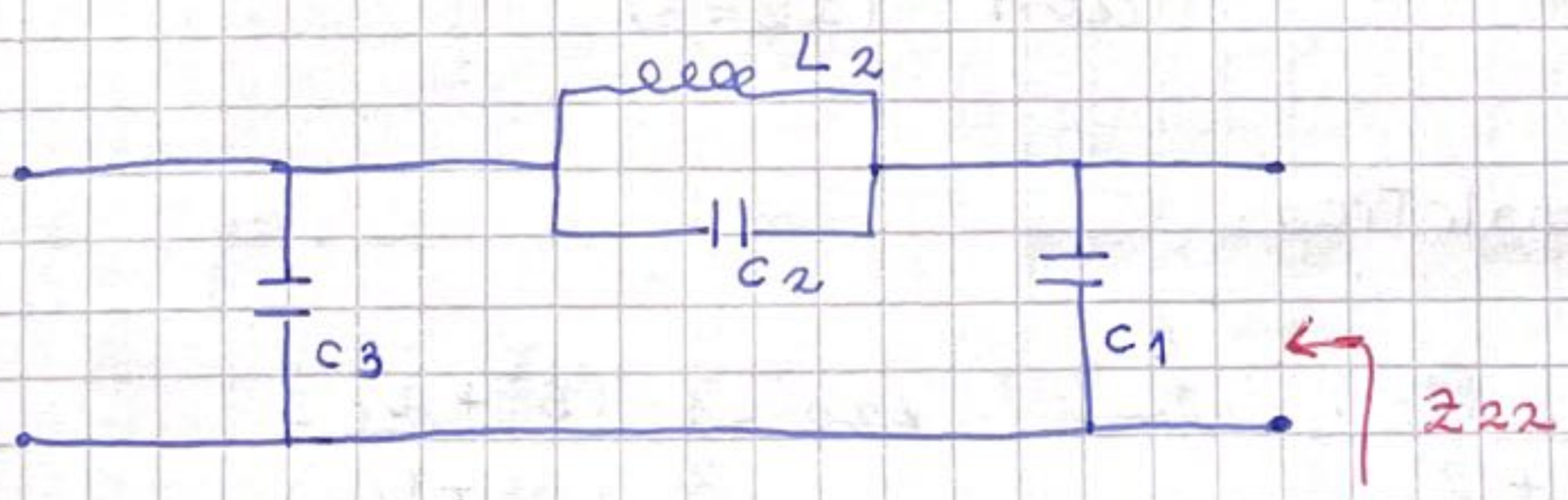
• $C_3 = 27/17$ F

• $\begin{cases} L_2 = \frac{289}{243}\ H \\ C_2 = 27/289\ F \end{cases}$ ⟶ $\frac{1}{C_L} = 9$

$Z = \frac{1/C \cdot s}{s^2+1/LC}$

$Y = Cs + \frac{1}{Ls} = \frac{LCs^2+1}{Ls} = \frac{\Delta C(s^2+1/LC)}{\Delta s}$

Red:



NOTA