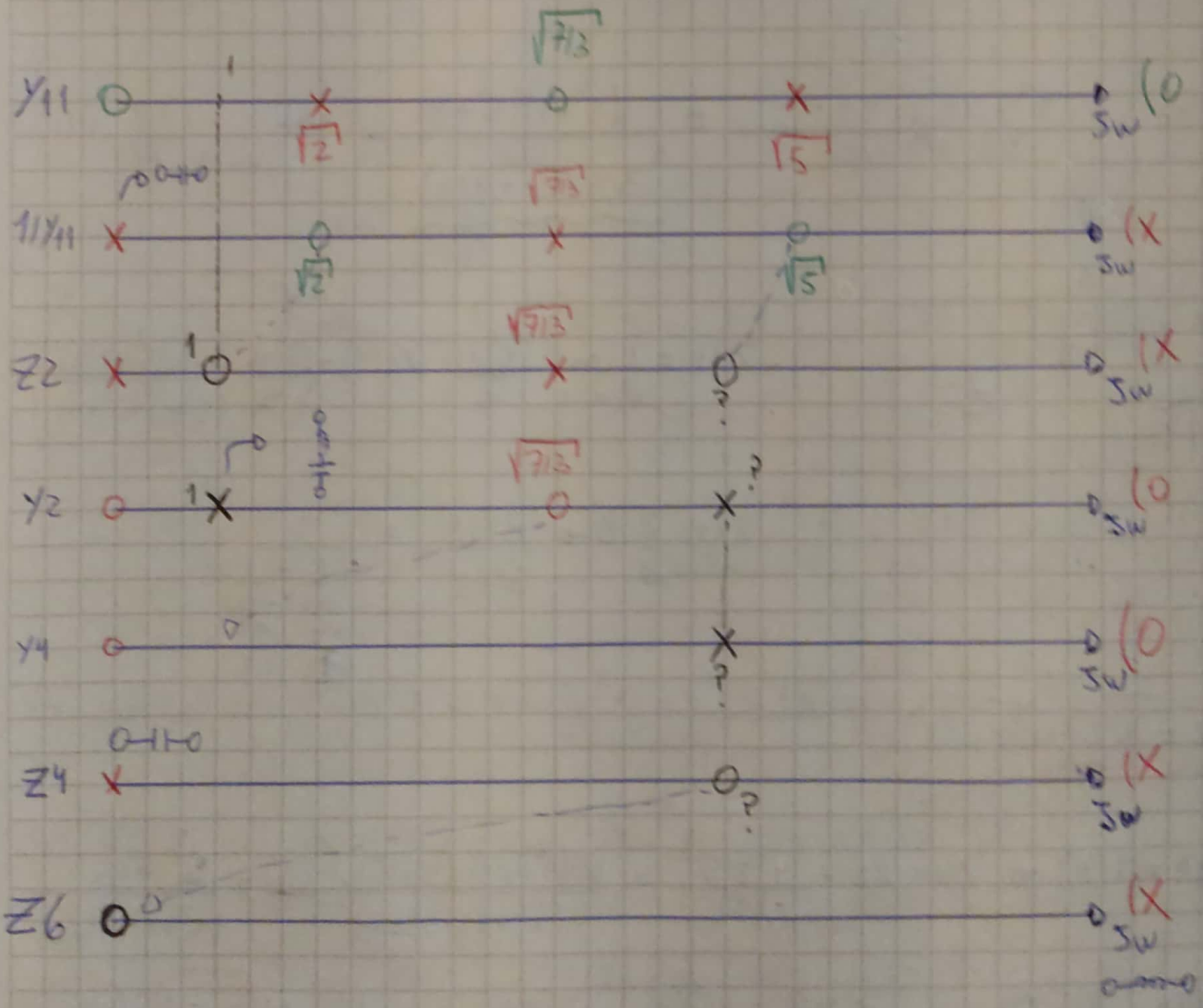
TAREA SEMANAL 11

1) a)

$$Y_{11} = \frac{3s(s^2+7/3)}{(s^2+2)(s^2+5)} \quad ; \quad Y_{21} = \frac{s(s^2+1)}{(s^2+2)(s^2+5)}$$

$Y_{11} = \left.\frac{I_1}{V_1}\right|_{V_2=0}$; $Y_{21} = \left.\frac{I_2}{V_1}\right|_{V_2=0}$

GENERADOR DE TENSIÓN (EMTRAN)



b) RESOLUCIÓN ANALÍTICA

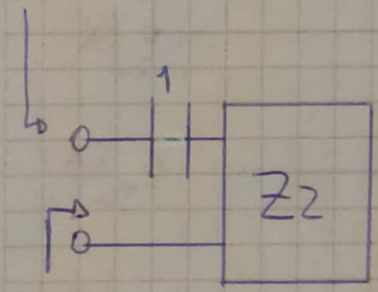
$$\frac{1}{Y_{11}} = \frac{(s^2+2)(s^2+5)}{3s(s^2+7/3)} \Big/ \left[\frac{(s^2+2)(s^2+5)}{3s(s^2+7/3)} - \underbrace{\frac{K_0}{s}}_{Z_{C1}}\right] = 0$$

$$= S_1$$

$$K_0 = \left[\frac{(s^2+2)(s^2+5)}{3(s^2+7/3)}\right]_{=S_1} = 1 \rightarrow Z_{C1} = \frac{1}{s} \rightarrow C_1 = 1$$

$$Z_2 = \frac{1}{Y_{11}} - \frac{1}{s} = \frac{s^4+7s^2+10-3s^2-7}{3s(s^2+7/3)}$$

$$Z_2 = \frac{s^4+4s^2+3}{3s(s^2+7/3)} = \frac{(s^2+1)(s^2+3)}{3s(s^2+7/3)}$$



$$Z_{K1} = \lim_{s^2 \to -1} \frac{s^2+1}{s} \; Y_2(s) = \left(\lim_{s^2 \to -1} \frac{s^2+1}{s} \frac{3(s^2+7/3)}{(s^2+1)(s^2+3)}\right)$$

$$Z_{K1} = \frac{Z}{Z} \rightarrow \frac{Z_{K1}s}{s^2+1} = \frac{1}{s\frac{1}{Z_{K1}} + \frac{1}{Z_{K1}s}}$$

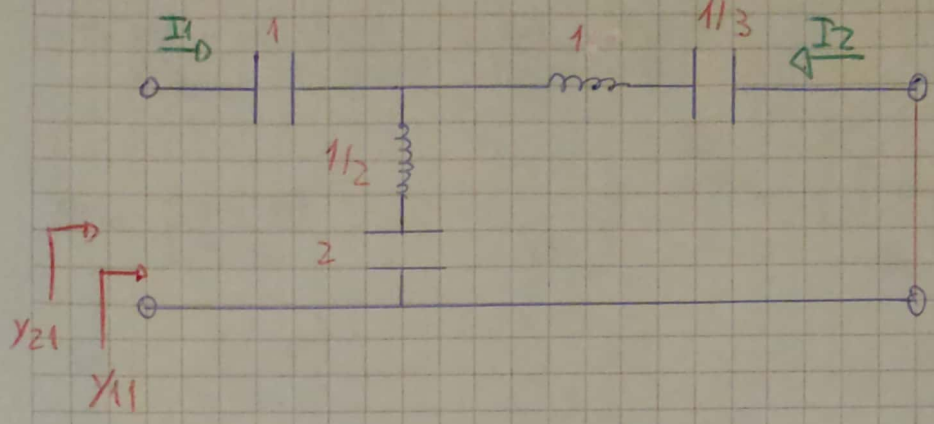
L_2 C_2

$L_2 = 1/2$; $C_2 = 2$

$$Z_4 = 1/Y_4 \rightarrow Y_4 = Y_2 - \frac{2s}{s^2+1} = \frac{3s(s^2+7/3)+(3+s^2)\cdot(-2s)}{(s^2+1)(s^2+3)} = \frac{s^3+s}{(s^2+1)(s^2+3)}$$

$$Y_4 = \frac{s(s^2+1)}{(s^2+1)(s^2+3)} \rightarrow Z_4 = \frac{(s^2+3)}{s} \Rightarrow Z_4 = s + \frac{1}{\frac{1}{3}s} \rightarrow L_3 = 1 \; ; \; C_3 = 1/3$$

CIRCUITO FINAL



VERIFICACIÓN

$$Y_{11} = \left.\frac{I1}{V1}\right|_{V2=0} \rightarrow Z_2 = \frac{1}{s2} + \frac{1}{2}s = \frac{1+s^2}{2s}$$

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

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

$$Y_{24} = \frac{2s(s^2+3)+s(s^2+1)}{(s^2+1)(s^2+3)} \Rightarrow Z_{24} = \frac{(s^2+1)(s^2+3)}{2s^3+6s+s^3+s} = \frac{(s^2+1)(s^2+3)}{3s(s^2+1)3)}$$

$$Z_T = 1/Y_{11} \Rightarrow Z_T = Z_{24} + \frac{1}{s} \Rightarrow Z_T = \frac{3s^2+7+s^4+4s^2+3}{3s(s^2+1)3)} \Rightarrow Z_T = \frac{s^4+7s^2+10}{3s(s^2+1)3)}$$ ✓

$$Y_{21} = \left.\frac{I2}{V1}\right|_{V2=0} = ? \rightarrow I1 = I2 + I3$$

PONDO

$$VX = \frac{V1 \cdot Z_{24}}{Z_T} = V1\,\frac{(s^2+1)(s^2+3)}{(s^2+2)(s^2+5)}$$

$$I_2 = \frac{VX}{Z_4} \rightarrow \frac{I2}{V1} = \frac{s(s^2+1)}{(s^2+2)(s^2+5)}$$ ✓