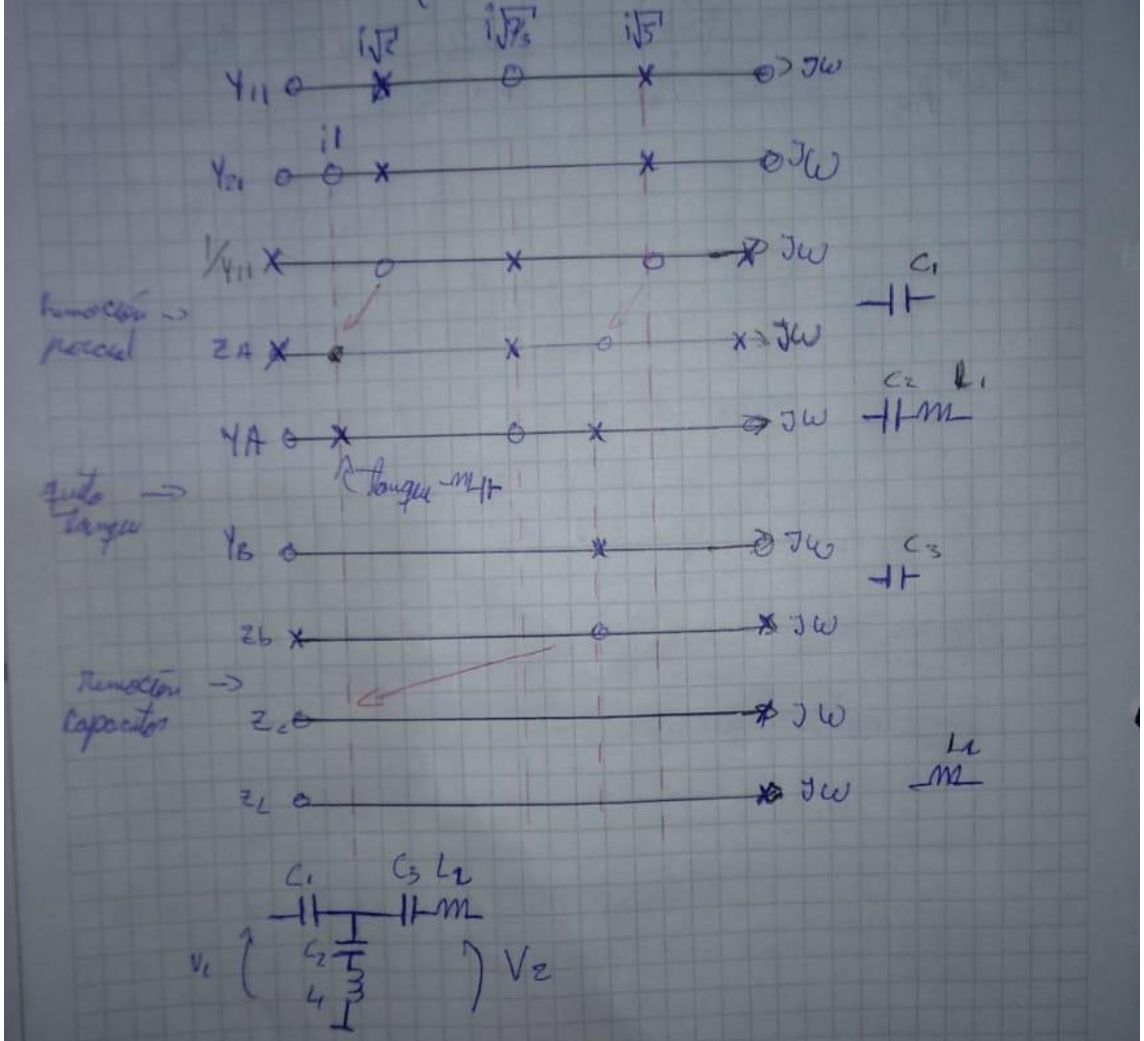
1

$$Y_{11} = \left.\frac{I_1}{V_1}\right|_{V_2=0} = \frac{3S(S^2+7/3)}{(S^2+2)(S^2+5)}$$

$$Y_{21} = \left.\frac{I_2}{V_1}\right|_{V_2=0} = \frac{S(S^2+\cdots)}{(S^2+2)(S^2+5)}$$



$$\frac{1}{sC_1} = \frac{1}{Y_{11}(i\omega)} \Rightarrow \frac{1}{C_1} = \frac{s(s^2+2)(s^2+5)}{3s(s^2+7/3)} = \frac{(2-1)(5-1)}{5(7/3-1)} = 1$$

$$\boxed{C_1 = 1}$$

$$Z_A = \frac{1}{Y_{11}} - \frac{1}{sC_1} = \frac{(s^2+2)(s^2+5)}{3s(s^2+7/3)} - \frac{1}{s} = \frac{s^4+7s^2+10-3s^2-7}{3s(s^2+7/3)}$$

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

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

$$Y_{LC} = \frac{1}{sL+\frac{1}{sC}} = \frac{s\,1/L}{s^2+\frac{1}{CL}} \quad ; \quad C_2L_1 = 1$$

$$\frac{s\,1/L_1}{s^2+1/C_2L_1} = Y_A(i) \Rightarrow 1/L_1 = \lim_{s\to i} \frac{(s^2+1)}{s} \frac{3s(s^2+7/3)}{(s^2+1)(s^2+5)} = \frac{3(7/3-1)}{(3-1)}$$

$$1/L_1 = 2 \Rightarrow \boxed{L_1 = 1/2}$$

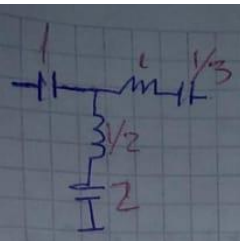
$$\hookrightarrow \boxed{C_2 = 2}$$

$$\boxed{Y_{L_1C_2} = \frac{2s}{s^2+1}}$$

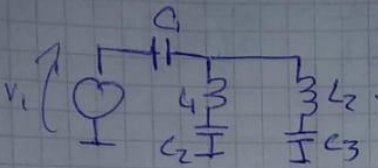
$$Y_B = Y_A - Y_{L_1C_2} = \frac{3s(s^2+7/3)}{(s^2+1)(s^2+3)} - \frac{2s}{(s^2+1)} = \frac{3s^3+3s-2s^3-6s}{(s^2+1)(s^2+3)}$$

$$Y_B = \frac{s^3+s}{(s^2+1)(s^2+3)} = \frac{s(s^2+1)}{(s^2+1)(s^2+3)} = \frac{s}{s^2+3} = \frac{1}{s+\frac{3}{s}} = \frac{1}{Z_{L_2}+Z_{C_3}}$$

$$\boxed{L_2 = 1 \quad ; \quad C_3 = 1/3}$$



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



$$I_2 = \frac{V_1}{Z_{TOTAL}} \cdot \frac{Z_{L_1C_2}}{Z_{L_1C_2} + Z_{L_2C_3}}$$

$$Y_{21} = \frac{Z_{L_1C_2}}{Z_{TOTAL}\left(Z_{L_1C_2} + Z_{L_2C_3}\right)}$$

$$Z_{L_1C_2} = sL_1 + \frac{1}{sC_2} = \frac{s^2 + 1/L_1C_2}{s\,1/L_1}$$

$$Z_{L_1C_2} = \frac{s^2+1}{s2} \quad ; \quad Z_{L_2C_3} = \frac{s^2+3}{s}$$

$$Z_{TOTAL} = \frac{1}{sC_1} + \left(\frac{1}{Z_{L_1C_2}} + \frac{1}{Z_{L_2C_3}}\right)^{-1} = \frac{1}{s} + \left(\frac{2s}{s^2+1} + \frac{s}{s^2+3}\right)^{-1}$$

$$Z_{TOTAL} = \frac{1}{s} + \left(\frac{2s(s^2+3) + s(s^2+1)}{(s^2+1)(s^2+3)}\right)^{-1}$$

$$Z_{TOTAL} = \frac{1}{s} + \left(\frac{(s^2+1)(s^2+3)}{3s^3+7s}\right) = \frac{1}{s} + \frac{(s^2+1)(s^2+3)}{3s(s^2+7/3)}$$

$$Z_{TOTAL} = \frac{3s^2 + 7 + s^4 + 4s^2 + 3}{3s(s^2+7/3)} = \frac{s^4 + 7s^2 + 10}{3s(s^2+7/3)}$$

$$Y_{21} = \frac{\frac{(s^2+1)}{2s}}{2\left(\frac{s^2+3}{s}\right) + \frac{(s^2+1)}{2s}} \cdot \frac{3s(s^2+7/3)}{(s^2+2)(s^2+5)}$$

$$Y_{21} = \frac{(s^2+1)}{35^3+7} \quad \frac{s(35^3+7)}{(s^2+2)(s^2+5)}$$

$$Y_{21} = \frac{s(s^2+1)}{(s^2+2)(s^2+5)}$$

$$Y_{11} = \left.\frac{I_1}{V_1}\right|_{V_2=0} = \frac{1}{Z_{TOTAL}} = \frac{3s(s^2+7/3)}{(s^2+2)(s^2+5)}$$