

Claire 22/9

1° TP6

$$Y(s) = \frac{(s^2+1)(s^2+5)(s^2+20)}{s(s^2+10)(s^2+2)} = Z(s) = \frac{1}{y(s)}$$

$$Z(s) = \frac{K_0}{s} + K_{\infty} \cdot s + \frac{2K_i \cdot s}{s^2 + \omega_i}$$

$$y(s) = \frac{s(s^2+10)(s^2+2)}{(s^2+1)(s^2+5)(s^2+20)}$$

$$\lim_{s \rightarrow 0} \frac{K_0}{s} = 0, K_0 = 0$$

$$\lim_{s \rightarrow \infty} K_{\infty} \cdot s \neq 0 + 0 \Rightarrow K_{\infty} = 1$$

$$\lim_{s^2 \rightarrow -1} Y(s) = 2K_1 \Rightarrow \lim_{s^2 \rightarrow -1} \frac{s(s^2+10)(s^2+2)}{(s^2+1)(s^2+5)(s^2+20)} \cdot \frac{(s^2+1)}{(s^2+1)}$$

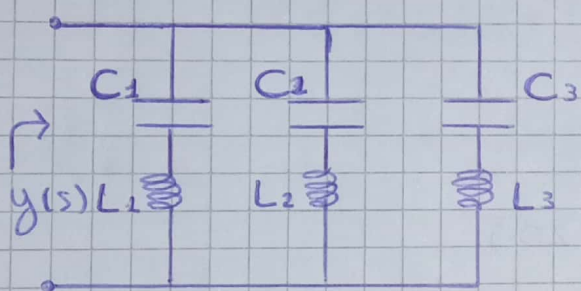
$$\lim_{s^2 \rightarrow -1} 2K_1 = \frac{(-1+10)(-1+2)}{(-1+5)(-1+20)} = \frac{9}{76}, K_1 = \frac{9}{152}$$

$$\lim_{s^2 \rightarrow -5} 2K_2 = \frac{(-5+10)(-5+2)}{(-5+1)(-5+20)} = \frac{1}{4}, K_2 = \frac{1}{8}$$

$$\lim_{s \rightarrow -20} \frac{(-20 + 10)(-20 + 2)}{(-20 + 1)(-20 + 5)} = \frac{12}{19}, \quad K_3 = \frac{6}{19}$$

$$Y(s) = 0 + 0 + \frac{2 \cdot s \left(\frac{9}{152} \right)}{s^2 + 1} + \frac{2 \cdot s \left(\frac{1}{8} \right)}{s^2 + 5} + \frac{s \left(\frac{12}{19} \right)}{s^2 + 20}$$

$$Y(s) = \frac{\frac{9}{76} \cdot s}{s^2 + 1} + \frac{\frac{1}{4} \cdot s}{s^2 + 5} + \frac{\frac{12}{19} \cdot s}{s^2 + 20}$$



$$C_1 = \frac{2 \left(\frac{9}{152} \right)}{1^2} = \frac{9}{76}$$

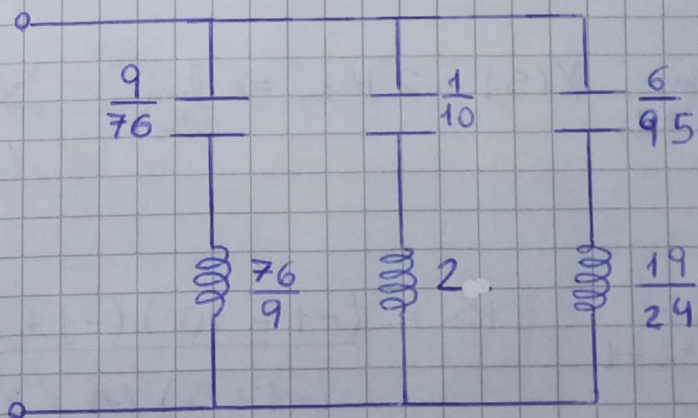
$$C_2 = \frac{2 \left(\frac{1}{4} \right)}{5} = \frac{1}{10}$$

$$L_1 = \frac{1}{2 \left(\frac{9}{152} \right)} = \frac{76}{9}$$

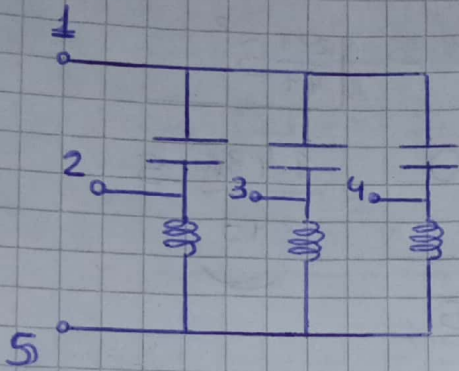
$$C_3 = \frac{2 \left(\frac{12}{19} \right)}{20} = \frac{6}{95}$$

$$L_2 = \frac{1}{2 \cdot \left(\frac{1}{4} \right)} = 2$$

$$L_3 = \frac{1}{2 \left(\frac{12}{19} \right)} = \frac{19}{24}$$



Verificación mediante MAI



$$Y_{mai} = \begin{pmatrix} \frac{9}{76} + \frac{1}{10} + \frac{6}{95} & -\frac{9}{76} & -\frac{1}{10} & -\frac{6}{95} & 0 \\ -\frac{9}{76} & \frac{9}{76} + \frac{76}{9} & 0 & 0 & -\frac{76}{9} \\ -\frac{1}{10} & 0 & 2 + \frac{1}{10} & 0 & -2 \\ -\frac{6}{95} & 0 & 0 & \frac{6}{95} + \frac{19}{24} & -\frac{19}{24} \\ 0 & -\frac{76}{9} & -2 & -\frac{19}{24} & \frac{76}{9} + 2 + \frac{19}{24} \end{pmatrix}$$

