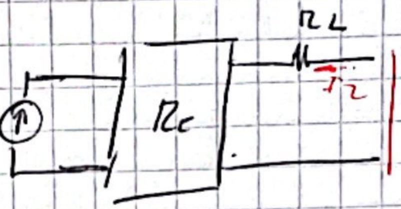
1)

$$\frac{-I_2}{I_1} = H \cdot \frac{s^2+5s+4}{s^2+8s+12} \qquad Z_{21} = 6H$$

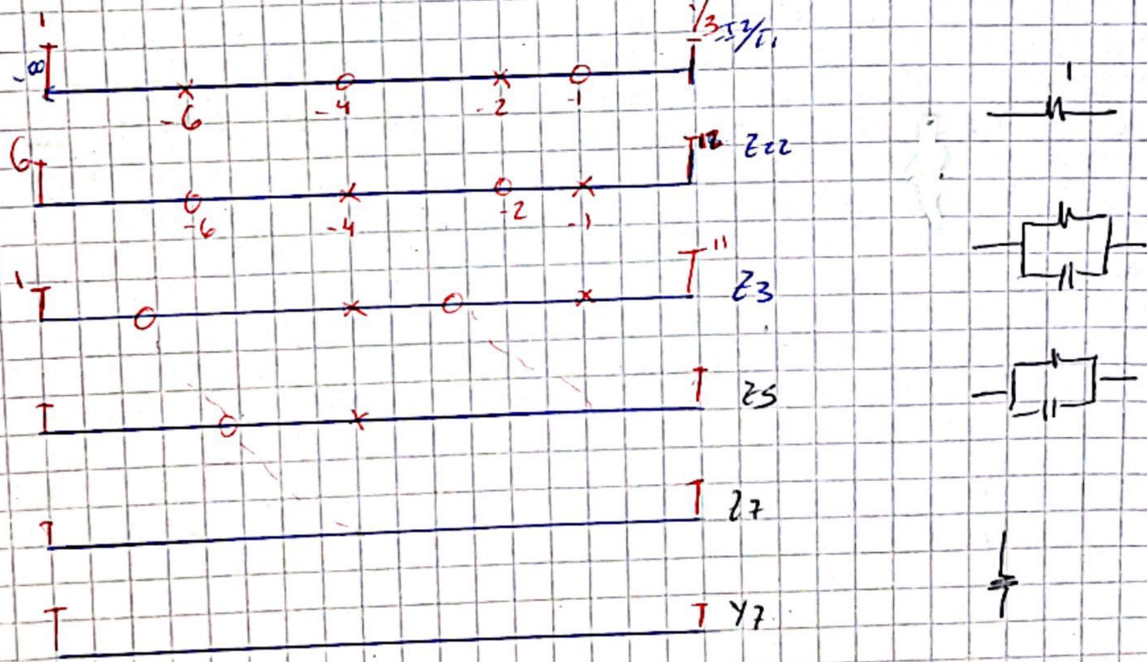


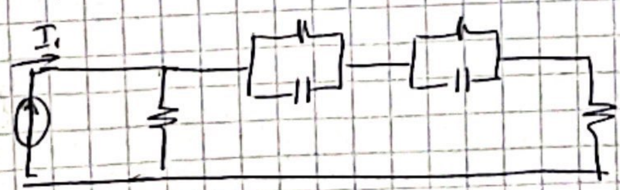
$$\frac{-I_2}{I_1} = \frac{Z_{21}}{Z_{22}}$$

$$\frac{-I_2}{I_1} = \frac{6H}{Z_{22}} = \cancel{H}\,\frac{s^2+5s+4}{s^2+8s+12}$$

$$Z_{22} = 6 \cdot \frac{(s+2)\cdot(s+6)}{(s+4)\cdot(s+1)}$$

Síntesis Gráfica





HOJA N°

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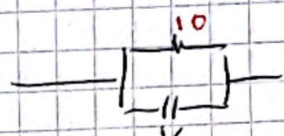
$$Z_{22} = 6 \cdot \frac{(s^2+8s+12)}{s^2+5s+4}$$

$$Z_3 = Z_{22} - 1 = \frac{6s^2+48s+72-s^2-5s-4}{s^2+5s+4}$$

$$Z_3 = \frac{5s^2+43s+68}{s^2+5s+4} = \frac{5s^2+43s+68}{(s+4)\cdot(s+1)}$$

$RC = 1$



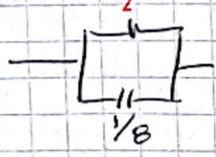
$$Z_5 = Z_3 - \frac{K}{(s+1)}$$

$$K = \lim_{s \to -1} Z_3 \cdot (s+1) = \lim_{s \to -1} \frac{5s^2+43s+68}{(s+4)\cdot\cancel{(s+1)}} \cdot \cancel{(s+1)} = \frac{30}{3} = 10$$

$$Z_5 = \frac{5s^2+43s+68}{s^2+5s+4} - \frac{10}{(s+1)} = \frac{5s^2+43s+68-10s-40}{(s+4)\cdot(s+1)}$$

$$Z_5 = \frac{5s^2+33s+28}{(s+4)\cdot(s+1)} = 5\,\frac{\cancel{(s+1)}\cdot(s+5,6)}{(s+4)\cdot\cancel{(s+1)}} =$$

$RC = \frac{1}{4}$ $R = 2$

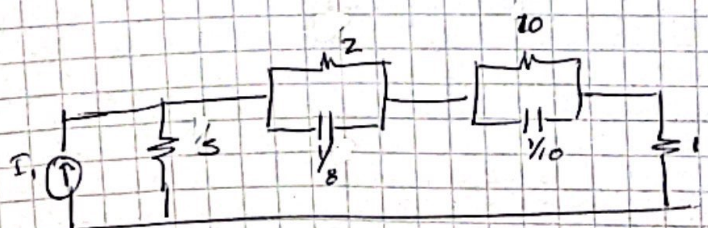


$$Z_7 = Z_5 - \frac{K_2}{(s+4)}$$

$$K_2 = \lim_{s \to -4} 5\,\frac{(s+\frac{56}{10})}{\cancel{s+4}} \cdot \cancel{(s+4)} = 8$$

$$Z_7 = \frac{5(s+\frac{56}{10})}{(s+4)} - \frac{8}{(s+4)} = \frac{5s+28-8}{(s+4)} = \frac{5s+20}{s+4} = 5 \cdot \frac{\cancel{(s+4)}}{\cancel{(s+4)}} =$$

$$Y_7 = \frac{1}{5}$$



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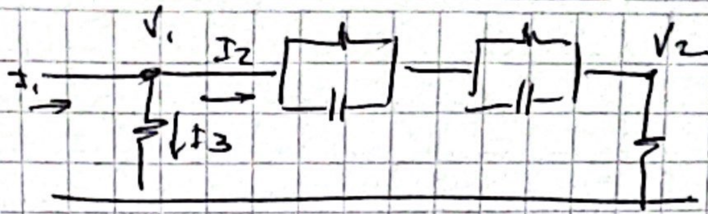
Verificación



$$I_1 = I_3 + I_2$$

$$I_3 = \frac{V_1}{5} \qquad I_2 = \frac{V_1 - V_2}{\frac{10}{(S+1)} + \frac{8}{S+4}} \qquad \frac{V_2}{1} = I_2$$

$$I_2\left(\frac{10 \cdot S + 40 + 8S + 8}{(S+1).(S+4)} + I_2\right) = +V_1$$

$$I_1 = I_2 + \frac{I_2}{5} + \frac{I_2}{5}\left(\frac{18S+48}{S^2+5S+4}\right)$$

$$I_1 = I_2.\left(1 + \frac{1}{5} + \frac{18S+48}{5(S^2+5S+4)}\right)$$

$$\frac{I_1}{I_2} = \frac{5(S^2+5S+4) + S^2+5S+4 + 18S+48}{5(S^2+5S+4)}$$

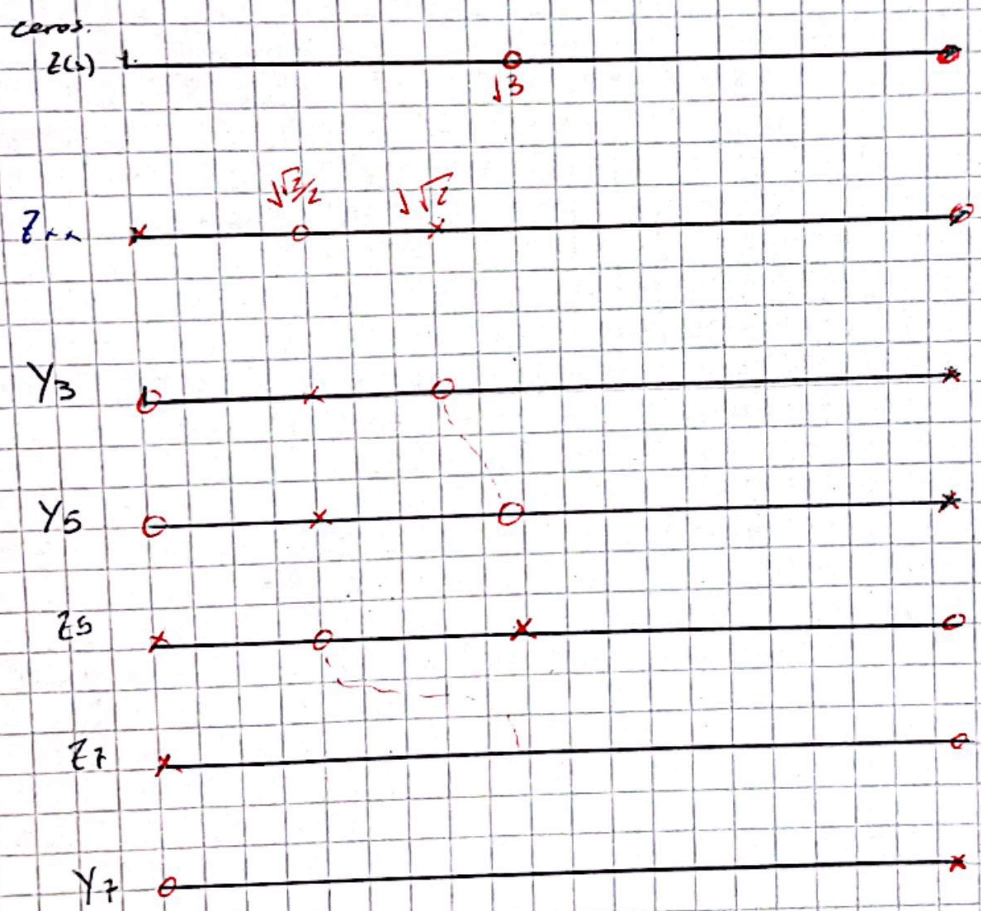
$$\frac{I_1}{I_2} = \frac{6S^2+48S+72}{5(S^2+5S+4)} = \frac{6.(S^2+8S+12)}{5.(S^2+5S+4)}$$

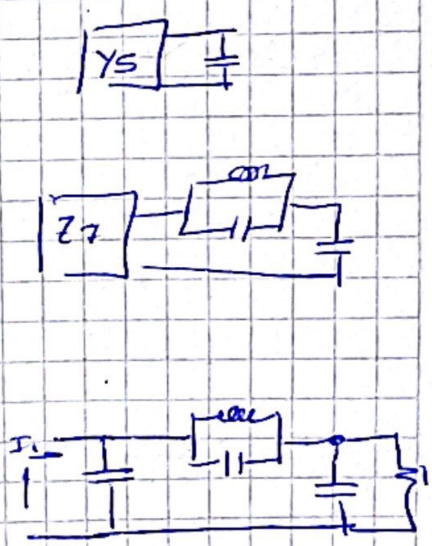
$$\frac{I_2}{I_1} = \frac{5\ (S^2+5S+4)}{6.(S^2+8S+12)} \qquad \boxed{\frac{5}{6} = H}$$

$$Z(s) = \frac{V_2}{I_1} = \frac{s^2+9}{s^3+2s^2+2s+1}$$

$$Z(s) = \frac{V_2}{I_1} = \frac{\dfrac{s^2+9}{s^3+2s} \longrightarrow Z_{21}}{1 + \dfrac{2s^2+1}{s^3+2s} \longrightarrow Z_{rn}}$$

Sintesis Grafica





$$Y_3 = \frac{1}{Z_{\wedge\wedge}} = \frac{s\,(s^2+2)}{2\,(s^2+\frac{1}{2})}$$

$$Y_5 = Y_3 - K\,s \Big|_{s^2=-9}$$

$$K = \lim_{s^2\to -9} \frac{Y_3}{s} = \lim_{s^2\to -9} \frac{\cancel{s}\,(s^2+2)}{2\,(s^2+\frac{1}{2})\,\cancel{s}} = \frac{-7}{-17} = \frac{7}{17}$$

cap de valor $\frac{7}{17}$

$$Y_5 = \frac{s^3+2s}{2\,(s^2+\frac{1}{2})} - \frac{7}{17}\,s = \frac{17s^3+34s-14s^3-7s}{34\,(s^2+\frac{1}{2})} = \frac{3s^3+27s}{34\,(s^2+\frac{1}{2})}$$

$$Y_5 = \frac{3s\,(s^2+9)}{34\,(s^2+1/2)} =$$

$$Z_5 = \frac{34\,(s^2+1/2)}{3s\,(s^2+9)} =$$

$\frac{1}{C} \to C = \frac{27}{289}$

$\frac{1}{LC} = 9$

$L = \frac{289}{243}$

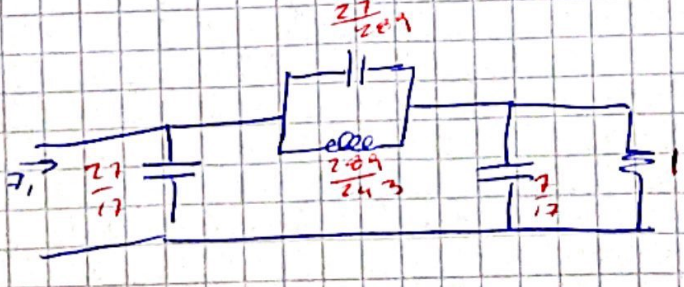
$$Z_7 = Z_5 - \frac{K_2\,s}{s^2+9}$$

$$K_2 = \lim_{s^2\to -9} Z_5\,\frac{(s^2+9)}{s} = \frac{34\,(s^2+1/2)}{3s\,\cancel{(s^2+9)}}\cdot\frac{\cancel{(s^2+9)}}{s} = \boxed{\frac{-289}{-27}}$$

$$Z_7 = \frac{34\,(s^2+1/2)}{3s\,(s^2+9)} - \frac{289\,s}{27\,(s^2+9)} = \frac{306s^2+153-289s^2}{27s\,(s^2+9)} = \frac{17s^2+153}{27s\,(s^2+9)}$$

$$Z_7 = \frac{17\,\cancel{(s^2+9)}}{27\,s\,\cancel{(s^2+9)}} = \frac{17}{27s}$$

$$Y_7 = \frac{27}{17}\,s$$



FECHA

En la expresion si $S \to 0$

$$Z = \frac{1}{9} \qquad K = \frac{1}{9}$$

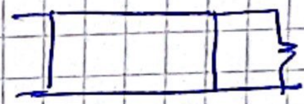
$$Z(s) = \frac{V_c}{I_1} = \frac{S^2+9}{9(s+1)\cdot(s^2+s+1)}$$

real

Si $s \to 0$ 

Si $S \to \infty$

$$\frac{V_2}{I_1} = \frac{1}{S} = 0.$$



verificacion

$$T_{total} = \begin{bmatrix} 1 & 0 \\ \frac{27s}{17} & 1 \end{bmatrix} \begin{bmatrix} 1 & \frac{289s}{27(s^2+9)} \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ \frac{7s}{17}+1 & 1 \end{bmatrix}$$

$$Z = \frac{V_2}{I_1} = \frac{1}{C}$$

$$total = \begin{bmatrix} 1 & \frac{289s}{27(s^2+9)} \\ \frac{27s}{17} & \frac{17s^2}{(s^2+9)}+1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ \frac{7s}{17}+1 & 1 \end{bmatrix}$$

$$C = \frac{27s}{17} + \left(\frac{17s^2}{s^2+9}+1\right)\left(\frac{7s}{17}+1\right)$$

$$C = \frac{27s}{17} + \left(\frac{17s^2+s^2+9}{s^2+9}\right)\left(\frac{7s+17}{17}\right)$$

$$C = \frac{1}{17}\left(27s + \frac{(18s^2+9)}{s^2+9}\cdot(7s+17)\right)$$

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$$C = \frac{1}{17}\left(27s + \frac{126s^3 + 306s^2 + 63s + 153}{(s^2+9)}\right)$$

$$C = \frac{1}{17}\left(\frac{27s^3 + 243s + 126s^3 + 306s^2 + 63s + 153}{s^2+9}\right)$$

$$C = \frac{1}{17}\left(\frac{153s^3 + 306s^2 + 306s + 153}{s^2+9}\right)$$

$$C = \frac{9s^3 + 18s^2 + 18s + 9}{s^2+9}$$

$$C = 9 \cdot \frac{(s^3 + 2s^2 + 2s + 1)}{s^2+9}$$

$$\frac{V_2}{I_1} = \frac{1}{C} = \frac{s^2+9}{9 \cdot (s^3 + 2s^2 + 2s + 1)}$$ verifico