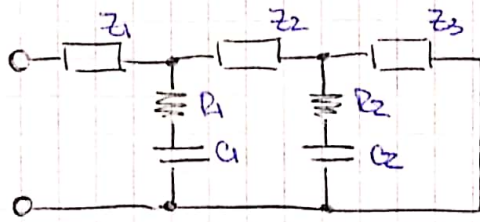


TS11

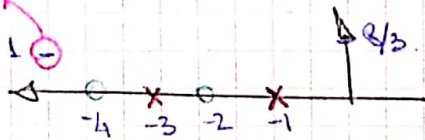


$$R_1 C_1 = \frac{1}{6} \quad R_2 C_2 = \frac{2}{7}$$

$$Z(s) = \frac{s^2 + 6s + 8}{s^2 + 4s + 3} = \frac{(s+2)(s+4)}{(s+1)(s+3)}$$

$$Z(\infty) = 1 \quad Z(0) = \frac{8}{3}$$

Resonancia parcial.



$$Z(s) - k_{\infty} = Z(s) = 0 \quad s = -6 \rightarrow \text{por logaritmo la condición de } R_1 C_1 = \frac{1}{6}$$

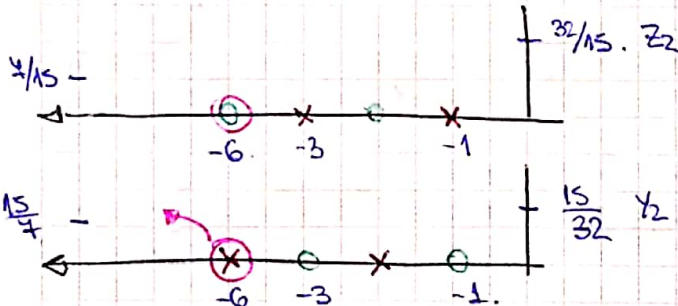
$$k_{\infty} = Z(-6) = \frac{(-6+2)(-6+4)}{(-6+1)(-6+3)} = \frac{8}{15}$$

$$Z_2(s) = \frac{s^2 + 6s + 8}{s^2 + 4s + 3} - \frac{8}{15} = \frac{15s^2 + 90s + 120 - 8s^2 - 32s - 24}{15(s^2 + 4s + 3)} = \frac{7s^2 + 58s + 96}{15(s^2 + 4s + 3)}$$

$$Z_2(s) = \frac{7}{15} \cdot \frac{s^2 + \frac{58}{7}s + \frac{96}{7}}{s^2 + 4s + 3} = \frac{7}{15} \cdot \frac{(s+16/7)(3+6)}{(s+1)(s+3)}$$

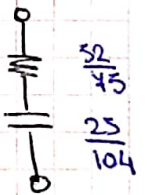
$$Z_2(0) = \frac{32}{15}$$

$$Z_2(\infty) = \frac{7}{15}$$



$$k_3 = \lim_{s \rightarrow -6} \frac{s+6}{s} Y_2(s) = \lim_{s \rightarrow -6} \frac{s+6}{s} \cdot \frac{15}{4} \cdot \frac{(s+1)(s+3)}{(s+16/7)(s+6)}$$

$$k_3 = \frac{(15)(-6+1)(-6+3)}{(-6)(7)(-6+16/7)} = \frac{45}{52}$$



$$Y_4 = Y_2 - \frac{s \cdot \frac{45}{52}}{s+6} = \frac{15}{4} \cdot \frac{(s+1)(s+3)}{(s+16/7)(s+6)} - \frac{s \cdot 45/52}{s+6}$$

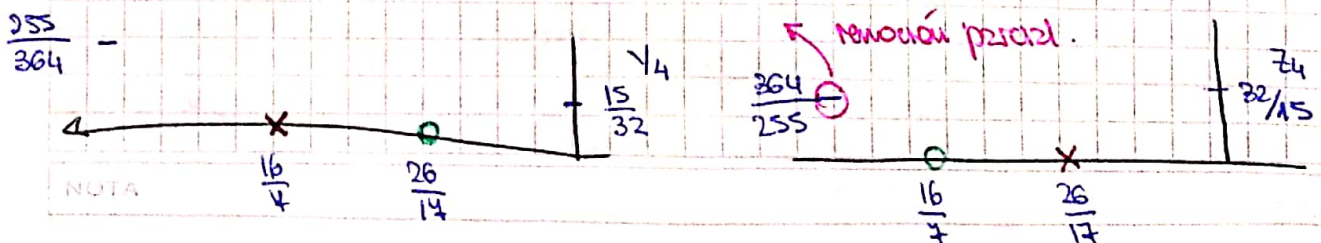
$$Y_4 = \frac{15(s^2 + 4s + 3) - [\frac{45}{52}(s^2 + \frac{360}{91}s)] \cdot 4}{4(s+16/7)(s+6)} = \frac{15s^2 + 60s + 45 - \frac{525}{52}s^2 - \frac{360}{13}s}{4(s+16/7)(s+6)}$$

$$Y_4 = \frac{\frac{255}{52}s^2 + \frac{480}{13}s + 45}{4(s+16/7)(s+6)} = \frac{255}{364} \cdot \frac{s^2 + \frac{128}{17}s + \frac{156}{17}}{(s+16/7)(s+6)} = \frac{255}{364} \cdot \frac{(s+26/14)(s+6)}{(s+16/7)(s+6)}$$

$$Y_4 = \frac{255}{364} \cdot \frac{s+26/14}{s+16/7}$$

$$Y_4(0) = \frac{15}{32}$$

$$Y_4(\infty) = \frac{255}{364}$$



NOTA

$$Z_G(s) = Z_4(s) - k_{\infty}^0$$

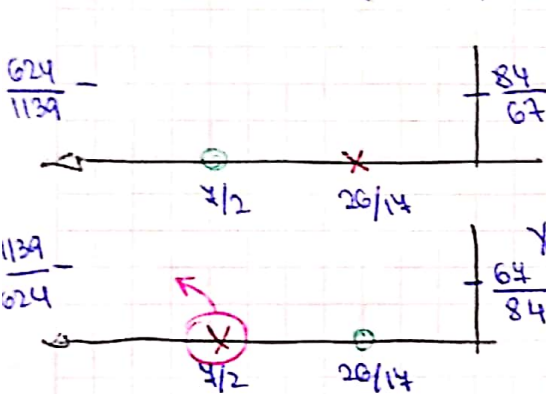
$$k_{\infty}^0 = Z_4(-\frac{1}{2}) = \frac{364}{255} \frac{(-\frac{1}{2} + \frac{16}{14})}{(-\frac{1}{2} + \frac{26}{14})} = \frac{884}{1005}$$

$$Z_G(s) = \frac{364}{255} \frac{(s + \frac{16}{14})}{(s + \frac{26}{14})} - \frac{884}{1005} = \frac{1005(364s + 832) - 884 \cdot 255 \cdot (s + \frac{26}{14})}{255 \cdot 1005 (s + \frac{26}{14})}$$

$$Z_G(s) = \frac{365820s + 836160 - 225420s - 344460}{256245(s + \frac{26}{14})} = \frac{140400s + 491400}{256245(s + \frac{26}{14})}$$

$$Z_G(s) = \frac{624}{1139} \frac{(s + \frac{1}{2})}{(s + \frac{26}{14})}$$

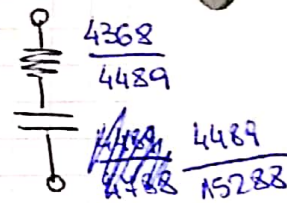
$$Z_G(0) = 84/64 \quad Z_G(\infty) = \frac{624}{1139}$$



$$k_{\frac{1}{2}} = \lim_{s \rightarrow -\frac{1}{2}} \frac{s + \frac{1}{2}}{s} \cdot \frac{624}{1139} = \frac{624}{1139}$$

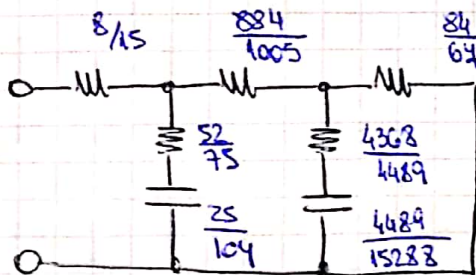
$$k_{\frac{26}{14}} = \lim_{s \rightarrow -\frac{26}{14}} \frac{(s + \frac{1}{2})}{s} \cdot \frac{1139}{624} \frac{(s + \frac{26}{14})}{(s + \frac{1}{2})} = \frac{1139}{624} \frac{(-\frac{1}{2} + \frac{26}{14})}{(-\frac{1}{2})} = \frac{4489}{4368}$$

$$k_{\frac{26}{14}} = \frac{1139}{624} \frac{(-\frac{1}{2} + \frac{26}{14})}{(-\frac{1}{2})} = \frac{4489}{4368}$$

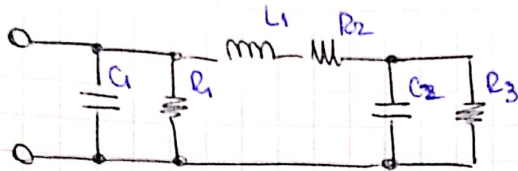


$$Y_8 = Y_6 - \frac{s \cdot \frac{4489}{15288}}{s + \frac{1}{2}} = \frac{1139}{624} \frac{s + \frac{26}{14}}{s + \frac{1}{2}} - \frac{s \cdot \frac{4489}{4368}}{s + \frac{1}{2}} = \frac{1139s + 1742 - \frac{4489}{4}s}{624(s + \frac{1}{2})}$$

$$Y_8 = \frac{3484/4 s + 1742}{624(s + \frac{1}{2})} = \frac{3484}{4 \cdot 624} \frac{(s + \frac{1}{2})}{(s + \frac{1}{2})} = \frac{64}{84}$$



②



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

$$Z(s) = \frac{s^2 + s + 1}{s^3 + 3s^2 + 4s + 5}$$

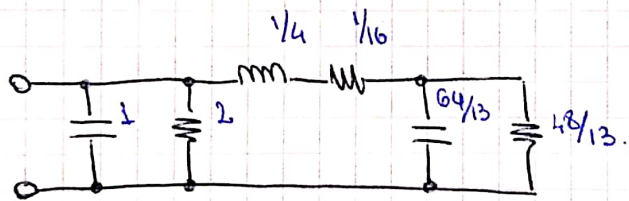
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$$Y(s) = \frac{s^3 + 3s^2 + 4s + 5}{s^2 + s + 1}$$



$$\begin{array}{r} s^3 + 3s^2 + 4s + 5 \\ - (s^3 + s^2 + s) \\ \hline 2s^2 + 6s + 5 \end{array} \quad \begin{array}{l} \frac{s^2 + s + 1}{s} \\ \frac{1}{s} \end{array}$$

$$\begin{array}{r} 2s^2 + 6s + 5 \\ - (2s^2 + 2s + 2) \\ \hline 4s + 3 \end{array} \quad \begin{array}{l} \frac{2s^2 + 2s + 2}{2} \\ \frac{1}{2} \end{array}$$

$$\begin{array}{r} s^2 + s + 1 \\ - (s^2 + \frac{3}{4}s) \\ \hline \frac{1}{4}s + 1 \end{array} \quad \begin{array}{l} \frac{4s + 3}{4} \\ \frac{1}{4} \end{array}$$

$$\begin{array}{r} \frac{1}{4}s + 1 \\ - (\frac{1}{4}s + \frac{3}{16}) \\ \hline \frac{13}{16} \end{array} \quad \frac{1}{16}$$

$$\begin{array}{r} 4s + 3 \\ - 4s \\ \hline 3 \end{array} \quad \frac{13}{16}$$

$$\begin{array}{r} 4s + 3 \\ - 4s \\ \hline 3 \end{array} \quad \frac{64}{13}s$$

$$\begin{array}{r} 3 \\ - 3 \\ \hline 0 \end{array} \quad \frac{13}{16}$$

$$\begin{array}{r} 0 \\ - 0 \\ \hline 0 \end{array} \quad \frac{48}{13}$$

