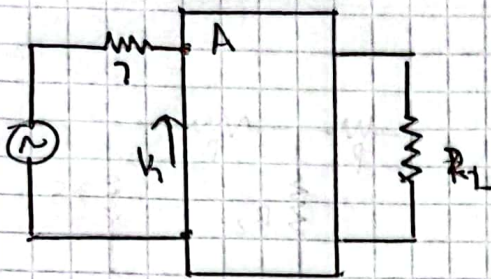


TS.15



Gleby  $m=4$

$\alpha = 7 \text{ dB}$

$$Z_1 = \frac{1+S_{11}}{1-S_{11}}$$

$$|S_{11}|^2 = 1 - |S_{21}|^2$$

$$|S_{21}|^2 = \frac{1}{1 + \frac{1}{\alpha^2} \left( \frac{1}{\omega^4} - \omega^4 \right)^2} = \frac{1}{1 + \frac{1}{64} \left( \frac{1}{\omega^4} - \omega^4 \right)^2}$$

$$\frac{1}{\alpha^2} = 10^{0.7} - 1 = 0.2589$$

$$|S_{21}|^2 = \frac{1}{1 + 0.2589 \left( \frac{1}{\omega^4} - \omega^4 \right)^2}$$

$$|S_{21}|^2 = \frac{1}{1 + 0.2589 \left( \frac{1}{64\omega^8} - \frac{1}{64\omega^8} + \frac{1}{8\omega^4} - \frac{1}{64\omega^8} + \frac{1}{64\omega^8} - \frac{1}{8\omega^4} + \frac{1}{8\omega^4} - \frac{1}{8\omega^4} + 1 \right)}$$

$$|S_{21}|^2 = \frac{1}{1 + 0.2589 \left( \frac{1}{64\omega^8} - \frac{1}{128\omega^6} + \frac{1}{8\omega^4} - \frac{1}{16\omega^2} + 1 \right)}$$

$$|S_{21}|^2 = \frac{1}{\left( \frac{1}{64} + \omega^8 - \frac{1}{2\omega^6} + \frac{1}{2\omega^4} - \frac{1}{2\omega^2} + 1 \right)}$$

Bueno volver en Python

$$|S_{11}|^2 = 1 - |S_{21}|^2 = \frac{\left( \omega^8 - \frac{1}{2\omega^6} + \frac{1}{2\omega^4} - \frac{1}{2\omega^2} + 1 \right)}{\left( \omega^8 - \frac{1}{2\omega^6} + \frac{1}{2\omega^4} - \frac{1}{2\omega^2} + 1 \right)^2} = S_{11} S_{11}^*$$

$$S_{11} = \frac{(S^4 + 0.007711S + 0.923399)(S^4 + 0.00774 - 1.923399)}{(S^4 + 0.139558 + 0.983397)(S^4 + 0.139558 - 0.983397)} = \frac{(S^4 + 0.007711S + 0.923399)(S^4 + 0.00774 - 1.923399)}{(S^4 + 0.139558 + 0.983397)(S^4 + 0.139558 - 0.983397)}$$

$$S_{11} = \frac{(S^4 + 0.003422 + 0.853574)(S^4 + 0.008262 + 0.746466)}{(S^4 + 0.271116 + 0.986546)(S^4 + 0.643846 + 0.29944)}$$

$$S_{11} = \frac{S^4 + 0.001168S^2 + 0.00755S + 0.12507}{S^4 + 0.952962S^2 + 1.45406S^2 + 0.74277S + 0.27568}$$

$$Z_1 = \frac{1+S_{11}}{1-S_{11}} \rightarrow \text{Hago cálculos con Python}$$

$$Z_1 = \frac{2S^4 + 0.964646S^3 + 2.4541S^2 + 0.75022S + 0.40069}{0.941278S^3 + 0.45452 + 0.73512S + 0.15067}$$

$$K_{\omega} = \lim_{S \rightarrow \infty} \frac{Z_1}{S} = \frac{2}{0.94} = 2.12477 \rightarrow L_1$$

$$Z_2 = Z_1 - SL_1 = \frac{0.5^4 + 0.5 + 0.28019S^2 + 0.430179S + 0.40069}{0.941278S^3 + 0.45452 + 0.73512S + 0.15067}$$

$$K_{\omega 2} = \lim_{S \rightarrow \infty} \frac{Z_2}{S} = \frac{0.5}{0.8919} = 1.0553 \rightarrow C_2$$

$$Y_4 = Y_2 - SC_2 = \frac{0.8^3 + 0.3123S + 0.1567}{0.8919S^2 + 0.430179S + 0.40069}$$



$$K_{\infty 3} = \lim_{s \rightarrow \infty} \frac{1}{Y_4 \cdot s} = \frac{0,8919}{0,3123} = 2,856 \rightarrow L_5$$

$$Z_6 = Z_4 - s L_5 = \frac{s^2 \cdot 0 + s \cdot 0 + 0,40069}{0,3123s + 0,1567} \rightarrow Y_6 = \frac{0,3123s + 0,1567}{0,40069}$$

$$K_{\infty 4} = \lim_{s \rightarrow \infty} \frac{Y_6}{s} = \frac{0,3123}{0,40069} = 0,7779 \rightarrow C_7$$

$$Y_8 = \frac{0,3123s + 0,1567}{0,40069} - s \cdot 0,7779 = \frac{0,7567}{0,40069} = 0,3910 \rightarrow Y_L$$

$$\cancel{Z_8} \quad Z_L = \frac{1}{Y_L} = 2,557$$

