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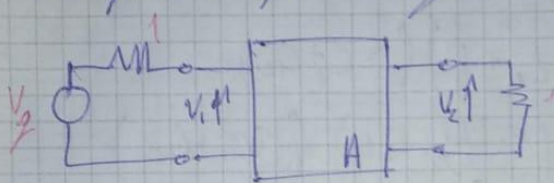
Para lazo Bessel 3°

$$T_{diff}(s) = \frac{1}{s} + \frac{1}{\frac{2}{s} + \frac{1}{\frac{5}{s}}} = \frac{1}{s} + \frac{5s}{2.5 + s^2} = \frac{15 + s^2 + 5s^2}{s(5 + s^2)}$$

$$T_{anh}(s) = \frac{s^2 6 + 15}{s(5 + s^2)} = \frac{anh(s)}{cosh(s)}$$

$$T(s) = \frac{K}{T_{diff}(s) + T_{anh}(s)} = \frac{K}{s^3 + 6s^2 + 15s + 15} \rightarrow M=15, L T(\infty)=1$$

No dissipativo; Normalizada en γ_0



$$b_1 = a_1 S_{11} + a_2 S_{12}$$

$$b_2 = a_1 S_{21} + a_2 S_{22}$$

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

$$S_{11} = \frac{z_1 - R_{01}}{z_1 + R_{01}}; z_1 = R_{01} \frac{(1 + S_{11})}{(1 - S_{11})}$$

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

$$|S_{21}|^2 = T(s) \cdot T(-s) = \frac{15}{s^3 + 6s^2 + 15s + 15} \cdot \frac{15}{-s^3 + 6s^2 - 15s + 15}$$

$$|S_{21}|^2 = \frac{15^2}{-s^6 + 6s^5 - 15s^4 + 15s^3 + (-6s^5) + 6s^4 - 6 \cdot 15s^3 + 6 \cdot 15s^2 - 15s^4 + 15 \cdot 6s^3 - 15^2s^2 + 15^2s - 15^2 + 6 \cdot 15s^2}$$

$$|S_{21}| = \frac{15^2}{-s^6 + 6s^4 - 45s^2 + 15^2}$$

$$P = s^2 \Rightarrow |S_{21}| = \frac{15^2}{-P^3 + 6P^2 - 45P + 15^2}$$

Poles

$$S_{12} = 2,32 ; S_{22} = -2,32 ; S_{21} = 2,54 e^{i0,76}$$

$$S_{31} = 2,54 e^{i0,76}$$

$$S_{32} = -2,54 e^{-i0,76}$$



$$|S_{11}| = \frac{-s^6 + 6s^4 - 45s^2}{-s^6 + 6s^4 - 45s^2 + 15^2}$$

Zeros

$$P_1 = 3\sqrt{5} e^{i1,107} ; P_2 = 3\sqrt{5} e^{-i1,107} ; P_3 = 0$$

$$S_{11} = 2,6 e^{0,553i} ; S_{21} = 2,6 e^{-0,553i}$$

$$S_{12} = 2,6 e^{0,553i} ; S_{22} = -2,6 e^{-0,553i}$$

$$S_{21} = \frac{3(s + 2,21 + i1,365)(s + 2,21 - i1,365)}{s^3 + 6s^2 + 15s + 15}$$

$$S_{11} = \frac{s(s^2 + 4,42s + 6,747)}{s^3 + 6s^2 + 15s + 15}$$

$$Z_{11} = R_o \frac{S_{11} + 1}{1 - S_{11}} ; S_{11} = \frac{s(s^2 + 4,42s + 6,74)}{s^3 + 6s^2 + 15s + 15}$$

$$Z_{11} = \frac{s^3 + 4,42s^2 + s6,74 + s^3 + 6s^2 + 15s + 15}{s^3 + 6s^2 + 15s + 15 - s^3 - 4,42s^2 - 6,74s}$$

$$Z_{11} = \frac{2s^3 + 10,42s^2 + 21,74s + 15}{1,58s^2 + 8,26s + 15}$$

$$2s^3 + 10,42s^2 + 21,74s + 15 \quad | \quad 1,58s^2 + 8,26s + 15$$

$$2s^3 + 10,42s^2 + 18,98s$$

$$\frac{2}{1,58} s$$

$$1,58s^2 + 8,26s + 15 \quad | \quad 2,76s + 15$$

$$1,58s^2 + 8,26s + 15$$

$$\frac{1,58}{2,76} s$$

$$\frac{1}{1}$$

$$2,76s + 15 \quad | \quad 15$$

$$2,76s$$

$$\frac{2,76}{15} s$$

$$15 \quad | \quad 15$$

