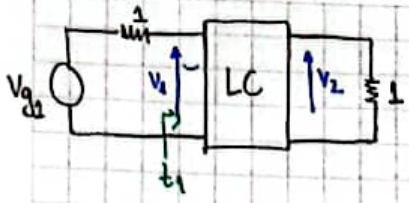
TS14



- Se busca una respuesta tipo Bessel de orden 3:

$$\frac{V_2}{V_1} = \frac{V_2}{V_g/2} = \frac{15}{s^3 + 6s^2 + 15s + 15} = T(s)$$

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

$$= \frac{225}{-s^6 + 6s^4 - 45s^2 + 225}$$

$$\Rightarrow |S_{11}|^2 = 1 - |S_{21}|^2 = \frac{-s^6 + 6s^4 - 45s^2}{-s^6 + 6s^4 - 45s^2 + 225} \rightarrow ⊛$$

$$= S_{11}(s)\cdot S_{11}(-s)$$

$$⊛ \quad -s^6 + 6s^4 - 45s^2 = \underbrace{(s^3 + a_1 s^2 + a_0 s)}_{S_{11}(s)}\underbrace{(-s^3 + a_1 s^2 - a_0 s)}_{S_{11}(-s)}$$

$$= -s^6 + \cancel{a_1 s^5} - a_0 s^4 \cancel{- a_1 s^5} + a_1^2 s^4 \cancel{- a_0 a_1 s^3} - a_0 s^4 \cancel{+ a_0 a_1 s^3} - a_0^2 s^2$$

$$= -s^6 + (a_1^2 - 2a_0)s^4 - a_0^2 s^2$$

$$\rightarrow a_0^2 = 45 \Rightarrow a_0 = 6{,}71 \; ; \; a_1^2 - 2a_0 = 6$$

$$a_1 = \sqrt{6 + 2a_0} = 4{,}41$$

$$\Rightarrow S_{11}(s) = \frac{s^3 + 4{,}41 s^2 + 6{,}71 s}{s^3 + 6s^2 + 15s + 15}$$

$$\Rightarrow z_1 = \frac{1 + S_{11}(s)}{1 - S_{11}(s)} = \frac{2s^3 + 10{,}41 s^2 + 21{,}71 s + 15}{1{,}59 s^2 + 8{,}29 s + 15}$$

Síntesis:

$2s^3 + 10{,}41 s^2 + 21{,}71 s + 15 \;\big|\; 1{,}59 s^2 + 8{,}29 s + 15$

$-(2s^3 + 10{,}41 s^2 + 18{,}83 s)$ — $1{,}26\,s$ (1,26)

$1{,}59 s^2 + 8{,}29 s + 15 \;\big|\; 2{,}88 s + 15$

$-(1{,}59 s^2 + 8{,}29 s)$ — $0{,}55\,s$ ($\frac{1}{b}$ 0,55)

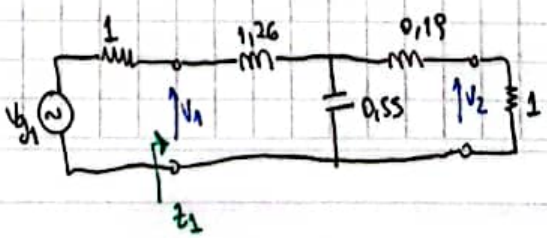
$2{,}88 s + 15 \;\big|\; 15$

$-2{,}88 s$ — $0{,}19\,s$ (0,19)

$15 \;\big|\; 15$

0 — 1 (1)

La red resulta:



NOTA