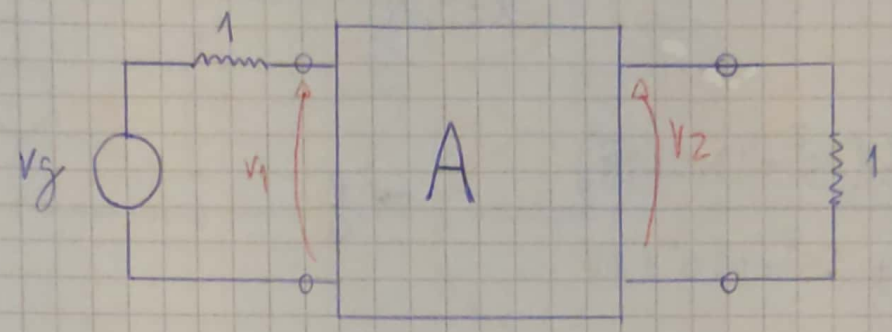
TAREA SEMANAL 13



1-

$R_0 = 1\,\Omega$. $|S11|^2 + |S21|^2 = 1$

$|S21|$ → UN BESSEL DE ORDEN 3. → $\text{cotgh}(S) = \frac{1}{S} + \frac{1}{\frac{3}{S} + \frac{S}{5}} = \frac{1}{S} + \frac{5S}{S^2+15} = \frac{6S^2+15}{S^3+15S}$

$$S_{21}(S) = \frac{15}{S^3 + 6S^2 + 15S + 15}$$

$$|S11|^2 = 1 - |S21(S)|^2$$

$$|S21(S)|^2 = \frac{225}{-S^6 + 6S^4 + (-45S^2) + 225}$$

$$|S11(S)|^2 = \frac{-S^6 + 6S^4 - 45S^2 + 225 - 225}{-S^6 + 6S^4 - 45S^2 + 225} = \frac{S^6 - 6S^4 + 45S^2 + 0}{S^6 - 6S^4 + 45S^2 - 225}$$

$$|S11(S)|^2 = \frac{S^2(S^4 - 6S^2 + 45)}{S^6 - 6S^4 + 45S^2 - 225} = \frac{S^2(S^4 - 6S^2 + 45)}{S^6 - 6S^4 + 45S^2 - 225}$$

$$s^4 - 6s^2 + 45 = (s^2 + xs + \sqrt{45})(s^2 - xs + \sqrt{45})$$

$$-6s^2 = -x^2 s^2 + 2\sqrt{45}s^2 \rightarrow x^2 s^2 = 2\sqrt{45} + 6$$

$$x = 4{,}41$$

$$S11(s) = \frac{s(s^2 + 4{,}41s + \sqrt{15})}{s^3 + 6s^2 + 15s^2 + 15} \rightarrow \frac{P}{Q}$$

$$Z1 = \frac{Q+P}{Q-P} \Rightarrow Z1 = \frac{2s^3 + 10{,}41s^2 + 21{,}71s + 15}{1{,}59s^2 + 8{,}29s + 15}$$

2- CAUER

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

$-\,2s^3 + 10{,}42s^2 + 18{,}87s + 0$ — $1{,}25s$ → SL

$2{,}84s + 15$

$1{,}59s^2 + 8{,}29s + 15 \;\big|\; 2{,}84s + 15$

$-\,1{,}59s^2 + 8{,}39s$ — $0{,}56s$ → SC

15

$2{,}84s + 15 \;\big|\; 15$

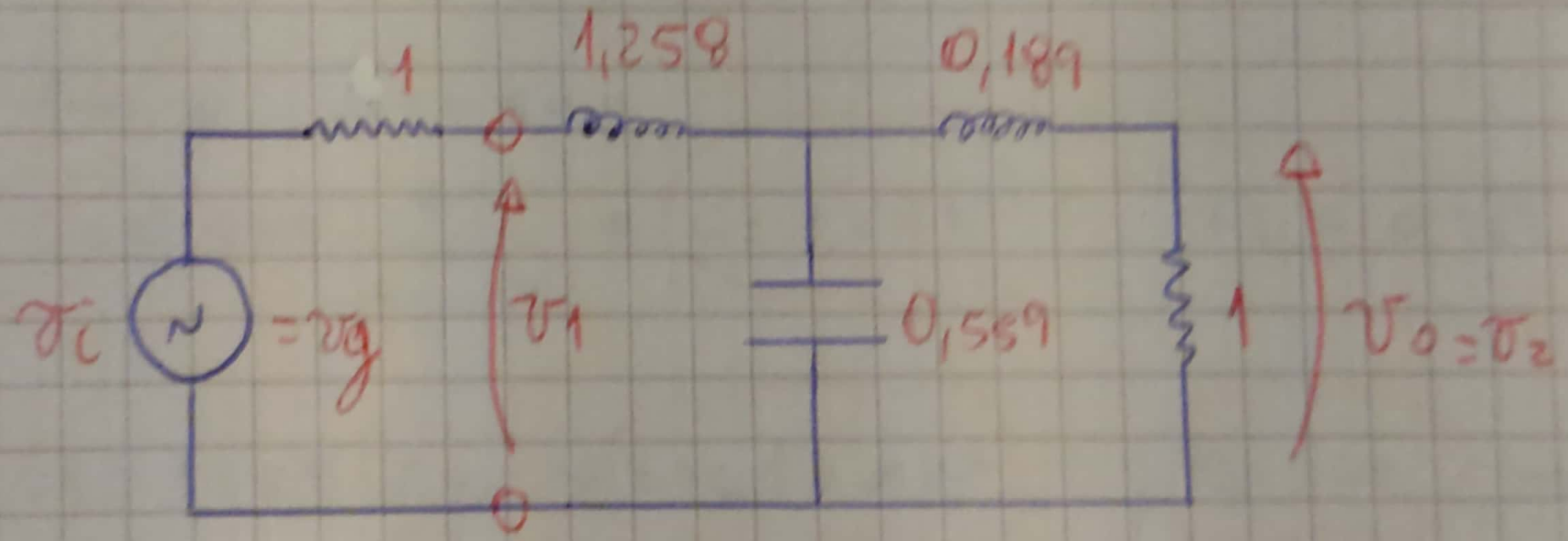
$-\,2{,}84s$ — $0{,}18s$ → SL

15

$15 \;\big|\; 15$

0 — 1 → 1

CIRCUITO FINAL



5- $W = 2M \cdot 10^6$ rad/s ; $Rg = 50\Omega$

$\Omega W = W$, $\Omega Z = 50\Omega$

$C = 0,559 \dfrac{1}{\Omega W \cdot \Omega Z} \rightarrow C = 1,78 \cdot 10^{-9}$ F , $L2 = 0,189 \cdot \dfrac{\Omega Z}{\Omega W} \Rightarrow L2 = 1,5\mu$HY

$L1 = 1,258 \dfrac{\Omega Z}{\Omega W} \rightarrow L1 = 10\mu$HY ; $R_L = 50\Omega \rightarrow \Omega Z$