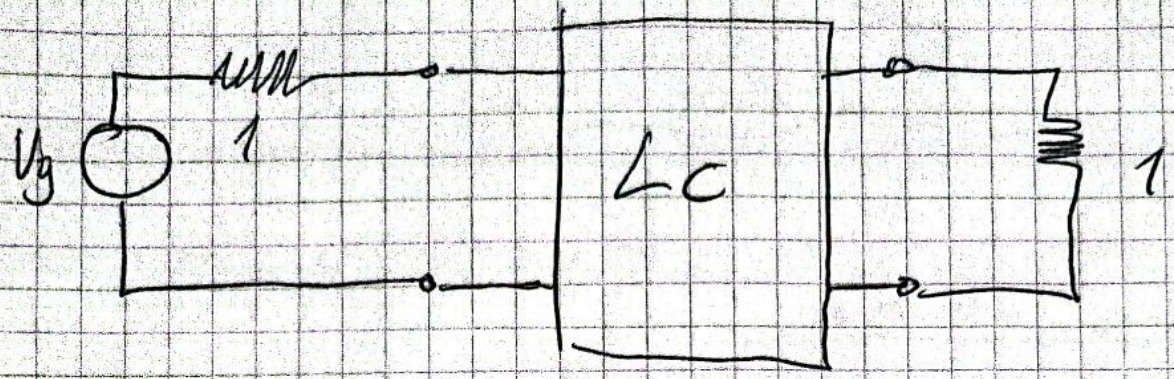
Ts 14:



Bessel 3er orden ?

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

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

$$|S_{21}|^2 = \frac{225}{-s^6 + 6s^4 - 45s^2 + 225}$$

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

$$= 1 + \frac{225}{s^6 - 6s^4 + 45s^2 - 225}$$

$$|S_{11}|^2 = \frac{s^6 - 6s^4 + 45s^2}{s^6 - 6s^4 + 45s^2 - 225}$$

$(-\$^6 + 6\$^4 + 45\$^2) =$

$(\$^3 + a\$^2 + b\$ + c)(\$^3 - a\$^2 - b\$ + c)$

$= (\$^3 + a\$^2 + b\$ + c)(-\$^3 + a\$^2 - b\$ + c)$

$$= \begin{cases} a^2\$^4 - b\$^4 + b^2\$^4 = \$^4(a^2 - 2b) = 6\$^4 \\ -b^2\$^2 = 45\$^2 \Rightarrow b = \sqrt{45}^7 \end{cases}$$

$b^2 = 45$

$\Rightarrow a^2 = 6 + 2b$

$\Rightarrow a = \sqrt{6 + 2\sqrt{45}}$

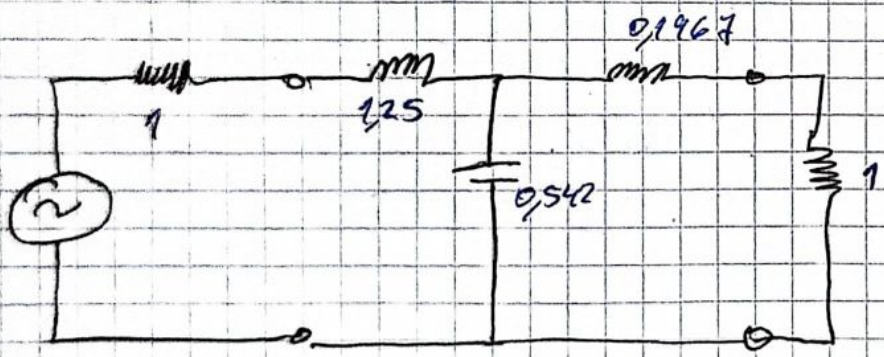
$$|S_{11}|^2 = S_{11}(\$)\, S_{11}(-\$)$$

$$\Rightarrow S_{11} = \frac{\$^3 + 4{,}406\$^2 + 6{,}708\$}{\$^3 + 6\$^2 + 15\$ + 15}$$

$$Z_{11} = \frac{1+S_{11}}{1-S_{11}} = \frac{1+(\quad)}{1-(\quad)}$$

$$= \frac{2\$^3 + 10{,}406\$^2 + 21{,}708\$ + 15}{1{,}594\$^2 + 8{,}292\$ + 15}$$

Sintetizamos



$2\$^3 + 10{,}4\$^2 + 21{,}7\$ + 15 \;\big|\; 1{,}6\$^2 + 8{,}3\$ + 15$

$-2\$^3 - 10{,}4\$^2 - 18{,}75\$ - 15 \;\big|\; 1{,}25\$$ → 1,25

$1{,}6\$^2 + 8{,}3\$ + 15 \;\big|\; 2{,}95\$ + 15$

$-1{,}6\$^2 - 8{,}3\$ \qquad 0{,}5424\$$ → 0,542

$2{,}95\$ + 15 \;\big|\; 15$

$-2{,}95 \qquad 0{,}1967\$$ → 0,1967

$15 \;\big|\; 15$

$0 \;/\; 1$ → 1

NOTA