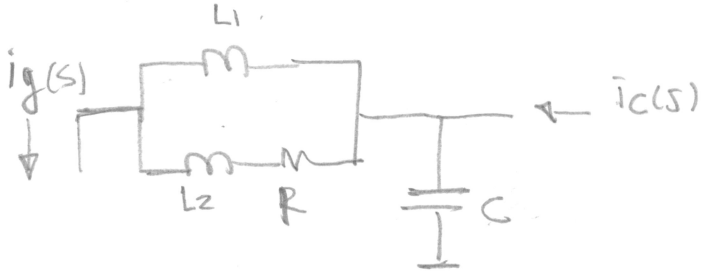
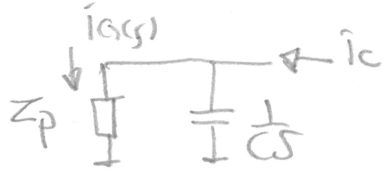
(Ex.1) FILTRO EMI ( ELECTRO MAGNETIC INTERFERENCE) P/ ELETRON. potência

Ache FUNÇÃO TRANSFERÊNCIA - $G(s) = \frac{i_g(s)}{i_c(s)}$

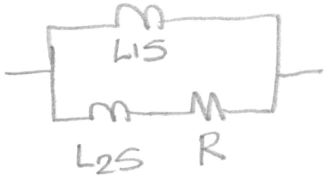



Uso divisor tensão:




$$i_{G(s)} = i_{c(s)} \cdot \frac{Z_p}{Z_p + \frac{1}{Cs}}$$

$Z_p$:




paralelo (produto / soma)

$$Z_p = \frac{(R + L_2 s) L_1 s}{R + (L_1 + L_2) s}$$

Voltando:

$$\frac{i_{G(s)}}{i_{c(s)}} = \frac{1/Cs}{\frac{(R + L_2 s) L_1 s}{R + (L_1 + L_2) s} + \frac{1}{Cs}} = \frac{1/Cs}{\frac{(R + L_2 s) L_1 C s^2 + R + (L_1 + L_2) s}{Rcs + (L_1 + L_2) C s^2}}$$

$$G(s) = \frac{1}{Cs} \cdot \frac{Rcs + (L_1 + L_2) C s^2}{(R + L_2 s) L_1 C s^2 + R + (L_1 + L_2) s}$$

$$G(s) = \frac{R + (L_1 + L_2) s}{L_1 L_2 C s^3 + R L_1 C s^2 + (L_1 + L_2) s + R}$$

→ ZERO: $\boxed{s = -\frac{R}{L_1 + L_2}}$

→ pólo: $L_1 L_2 C s^2 + R L_1 C s^2 + (L_1 + L_2) s + R$

posso dizer que como $R, L, C > 0$ Há raiz. complexa conjugada

2 complexas + 1 real

Exemplo $R = 1k$ $L1 = 1E-3$ $L_2 = 0.2E-3$ $C = 10E-9$

$$H(s) = \frac{1000 + 10.00125}{}$$

RAIZES (2000) $-8.3E5$

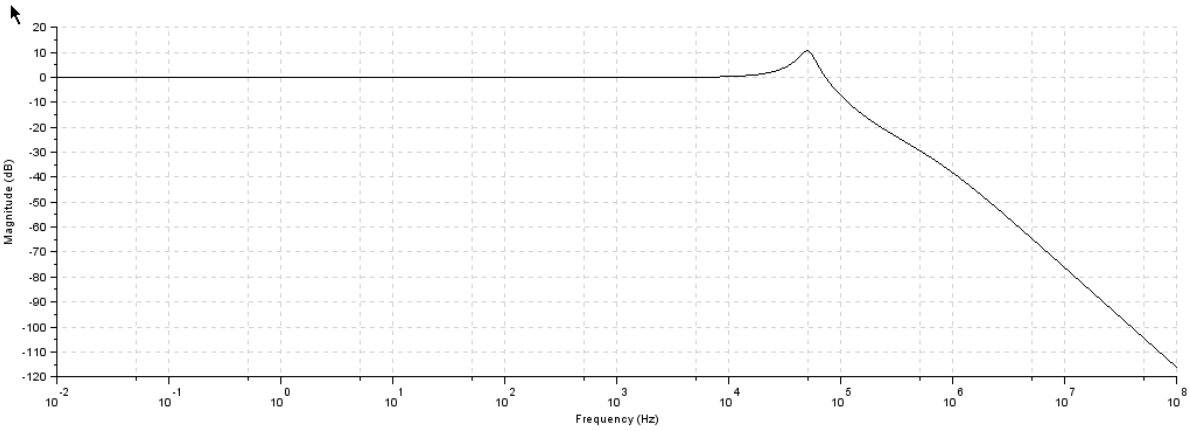
**Exemplo 1**

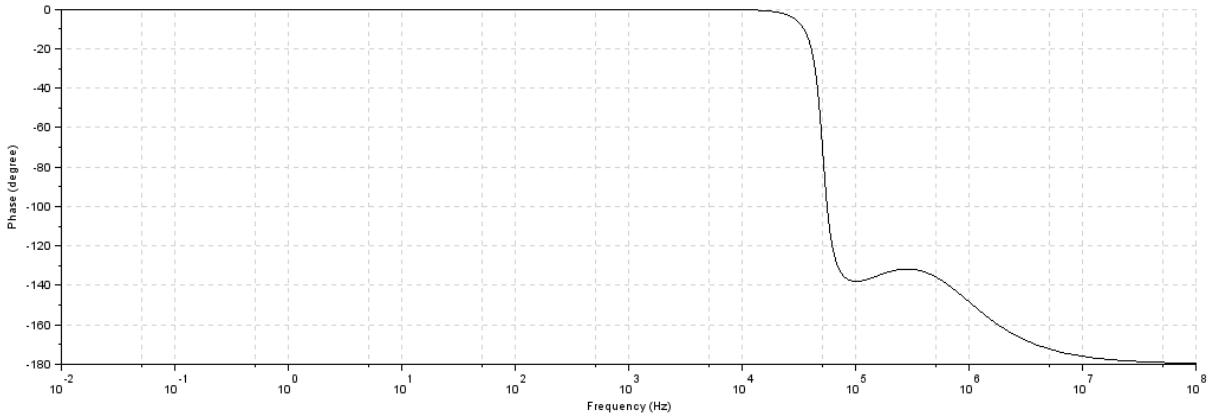
**Resolvido Scilab (free)**

```
function [] = Bode_ex1()

mode(0)

R=1000;
L1=1e-3;
L2=0.2e-3;
C=10e-9;

s=poly(0,'s')
h = syslin('c',(R+(L1+L2)*s) / (L1*L2*C*s^3 + R*L1*C*s^2 + (L1+L2)*s +R))
clf();bode(h,0.01,1e8);

num = poly( [R, (L1+L2)], "x","coeff")
disp('Zeros')
roots(num)

den = poly( [R, (L1+L2), (R*L1*C), (L1*L2*C) ], "x","coeff")
disp('Poles')
roots(den)



endfunction

```

**Output**

```
-->Bode_ex1
 s  =

    s
 h  =

                 1000 + 0.0012s
    ---------------------------------------
                                2             3
    1000 + 0.0012s + 1.000D-08s + 2.000D-15s
 num  =

    1000 + 0.0012x

 Zeros
 ans  =

  - 833333.33
 den  =

                                2             3
    1000 + 0.0012x + 1.000D-08x + 2.000D-15x

 Poles
 ans  =

  - 4898348.4
  - 50825.782 + 315423.46i
  - 50825.782 - 315423.46i
```


Magnitude (dB)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
$10^{-2}$ $10^{-1}$ $10^{0}$ $10^{1}$ $10^{2}$ $10^{3}$ $10^{4}$ $10^{5}$ $10^{6}$ $10^{7}$ $10^{8}$
Frequency (Hz)


Phase (degree)
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
$10^{-2}$ $10^{-1}$ $10^{0}$ $10^{1}$ $10^{2}$ $10^{3}$ $10^{4}$ $10^{5}$ $10^{6}$ $10^{7}$ $10^{8}$
Frequency (Hz)