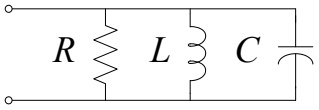
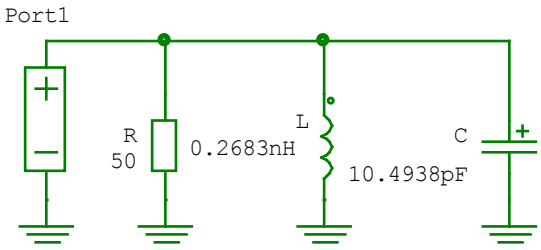
Dr. J. E. Rayas-Sánchez

S-PARAMETERS OF A SIMPLE RLC TANK

The next parallel lumped circuit resonator (or "tank" circuit) uses $R = 50\ \Omega$, $L = 0.2683$ nH, and $C = 10.4938$ pF.



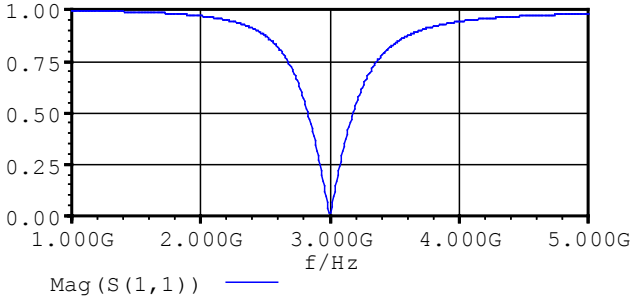
Implement the RLC circuit in APLAC as a one-port network, using a reference impedance of 50 Ω. Obtain the magnitude and phase (in degrees) of S_{11}, from 1 GHz to 5 GHz in linear scale, using 500 frequency points.

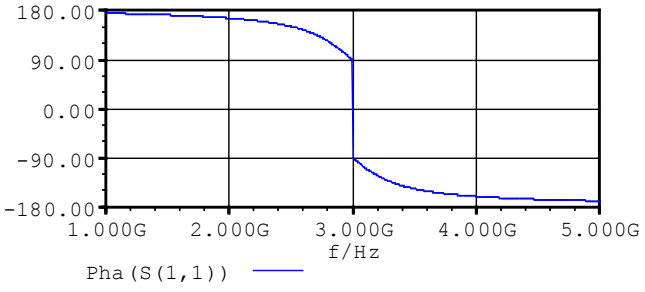



```
Sweep
"RLC Resonator"
LOOP 500 FREQ LIN 1GHz 5GHz
WINDOW=0 grid Y "" "" 0 1
WINDOW=1 grid Y "" "" -180 180

Show W=0 Y Mag(S(1,1))
Show W=1 Y Pha(S(1,1))
EndSweep
```

```
$ ------------------------------------------------------------
$ File    : ...\1_RLC_resonator\RLC_resonator_S-param.i
$ Schema file  : ... \RLC_resonator_S-param.n
$ Generated with APLAC Editor version 3.1.2
$ Fri Apr 27 16:18:14 2018
$ ------------------------------------------------------------
Res R Port10 GND
+ 50
Cap C Port10 GND
+ 10.4938pF
Ind L Port10 GND
+ 0.2683nH
DefNPort nport 1
+ Port10 GND 50
Sweep "RLC Resonator"
+ LOOP 500 FREQ LIN 1GHz 5GHz
+ WINDOW=0 grid Y "" "" 0 1
+ WINDOW=1 grid Y "" "" -180 180
Show W=0 Y Mag(S(1,1))
Show W=1 Y Pha(S(1,1))
EndSweep
```





Modify the "control object" in APLAC to plot S_{11} on a Smith Chart, from 10 MHz to 5 GHz using 300 frequency points.