

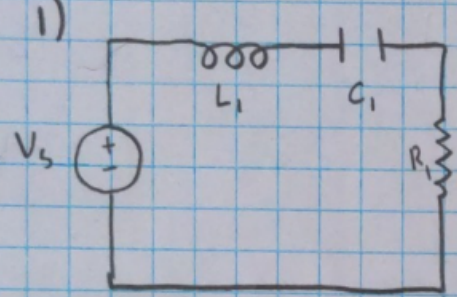
SERIES AND PARALLEL RESONANT CIRCUITS

Equipment:

Function Gen - GW Instek GFG-8250A GCS814772
Oscilloscope - Keysight DSOX1102G CN7096323
LCR - Keysight U1732C

$R_1 = 985.2 \Omega$ $R_2 = 986.6 \Omega$ $L_1 = 10.610 \text{ mH}$ $C_1 = 4.855 \text{ nF}$

1)

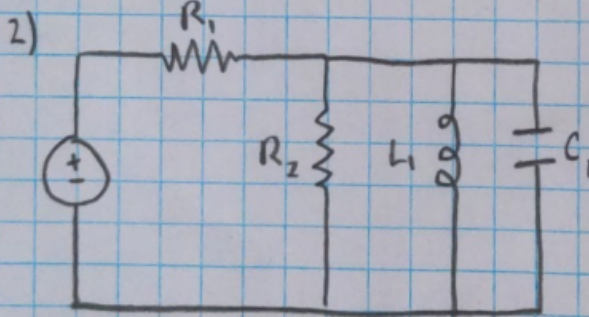


$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{10.610 \cdot 10^{-3} \cdot 4.855 \cdot 10^{-9}}} = 139330.9797 \text{ radians}$
22175.21415 Hz

$Q = \frac{\omega_0 L}{R} = 1.501$

$B = \frac{R}{L} = 92855.8 \text{ radians}$
14778.46 Hz

2)



$\omega_0 = \frac{1}{\sqrt{LC}} = 139330.9797 \text{ radians}$
22175.21415 Hz

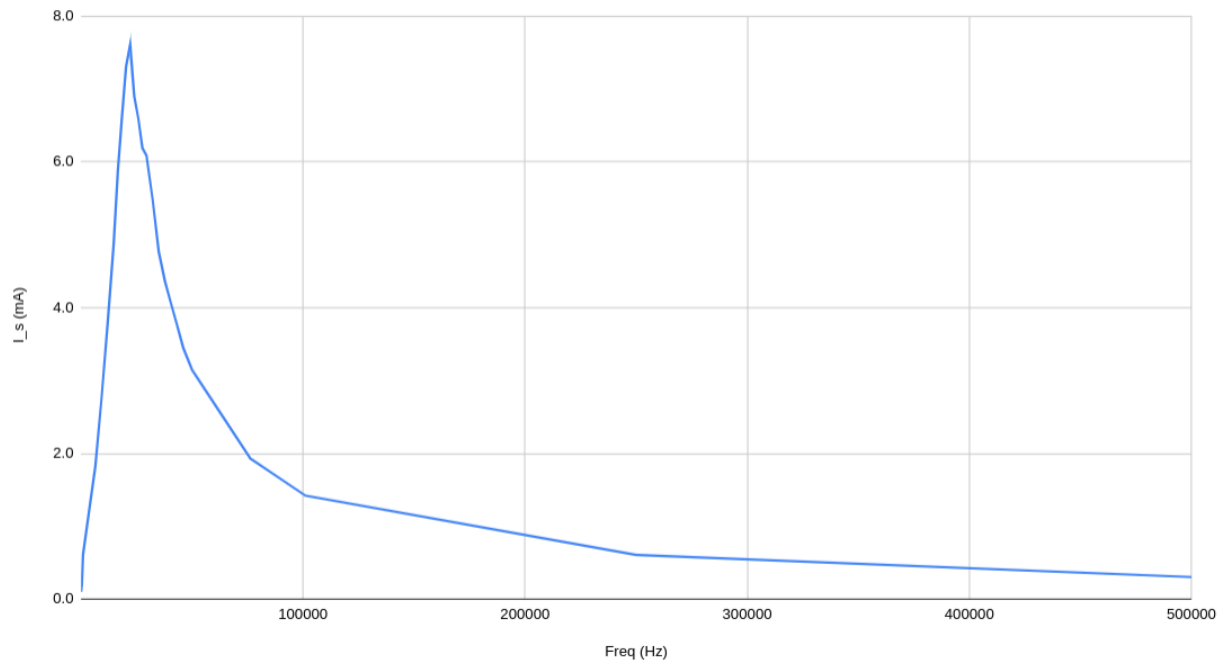
$Q = \omega_0 RC = 0.6664$

$B = \frac{1}{RC} = 209067.42 \text{ radians}$
33274.11 Hz

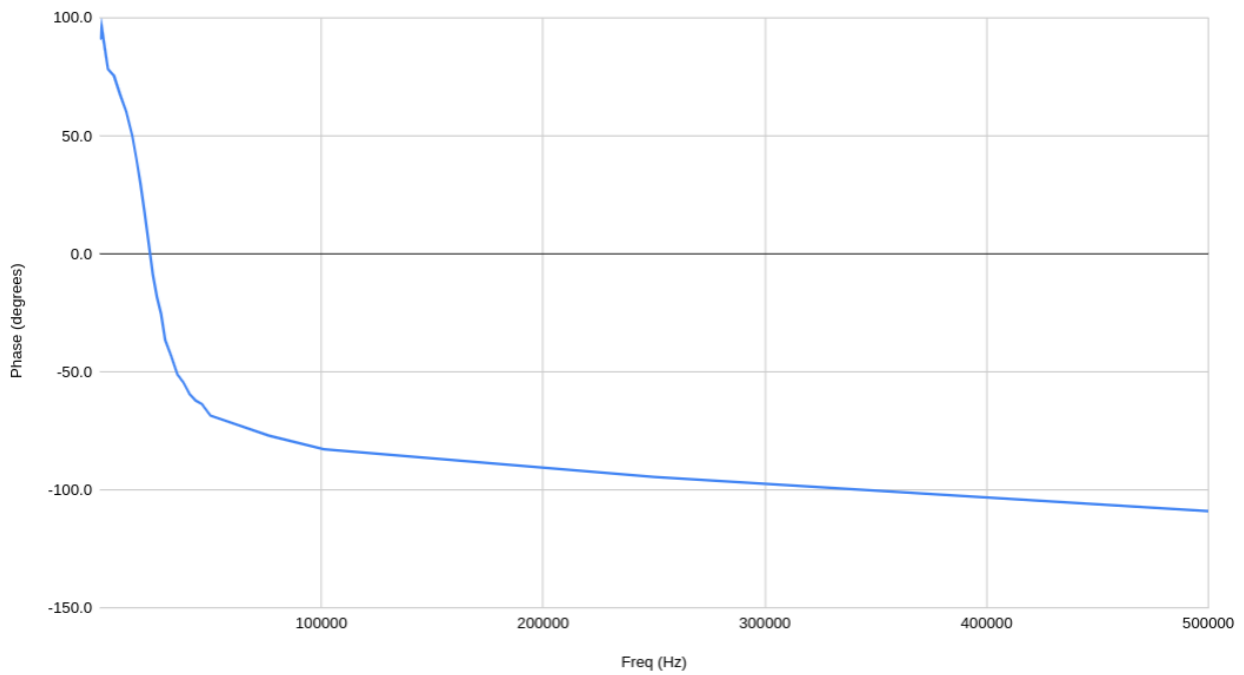
Part 1: Series Resonant Circuit

Series	985.2			
Freq (Hz)	V_s (v)	V_o (v)	Phase (degrees)	I_s (mA)
100	8.0	0.1	91.3	0.1
505	8.0	0.2	91.5	0.2
1009	8.0	0.6	96.4	0.6
3760	8.0	1.2	78.5	1.2
6520	8.0	1.8	75.6	1.8
9270	8.0	2.7	67.6	2.7
12030	8.0	3.7	60.5	3.8
14800	8.0	4.8	50.0	4.9
16640	8.0	5.8	40.2	5.9
18480	8.0	6.5	29.9	6.6
20330	8.0	7.2	17.7	7.3
22180	8.0	7.5	4.6	7.6
24030	8.0	6.8	-8.6	6.9
25880	8.0	6.5	-18.2	6.6
27720	8.0	6.1	-25.3	6.2
29570	8.0	6.0	-36.4	6.1
32330	8.0	5.4	-43.3	5.5
35090	8.0	4.7	-51.0	4.8
37840	8.0	4.3	-54.5	4.4
40600	8.0	4.0	-59.4	4.1
43360	8.0	3.7	-62.1	3.8
46120	8.0	3.4	-63.6	3.5
50080	8.0	3.1	-68.5	3.1
76400	8.0	1.9	-77.0	1.9
101130	8.0	1.4	-82.8	1.4
250000	8.0	0.6	-94.5	0.6
500010	8.0	0.3	-109.0	0.3

Series Resonant Circuit: I_s (mA) vs. Freq (Hz)



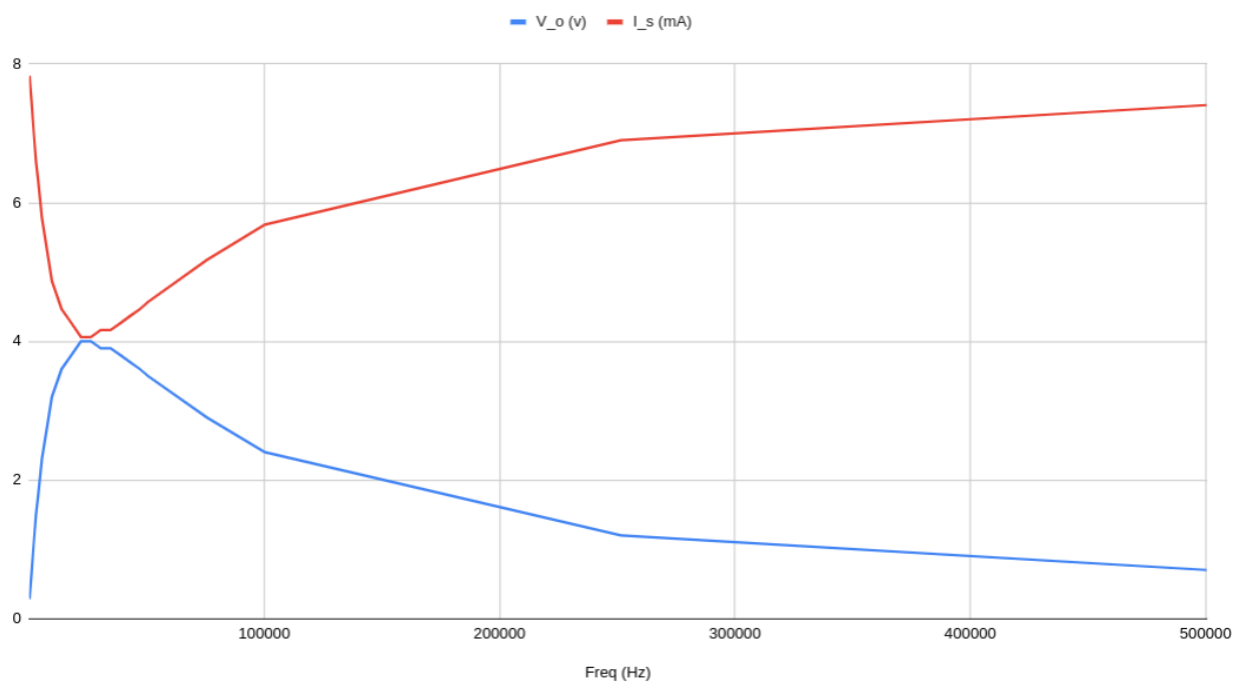
Series Resonant Circuit: Phase (degrees) vs. Freq (Hz)



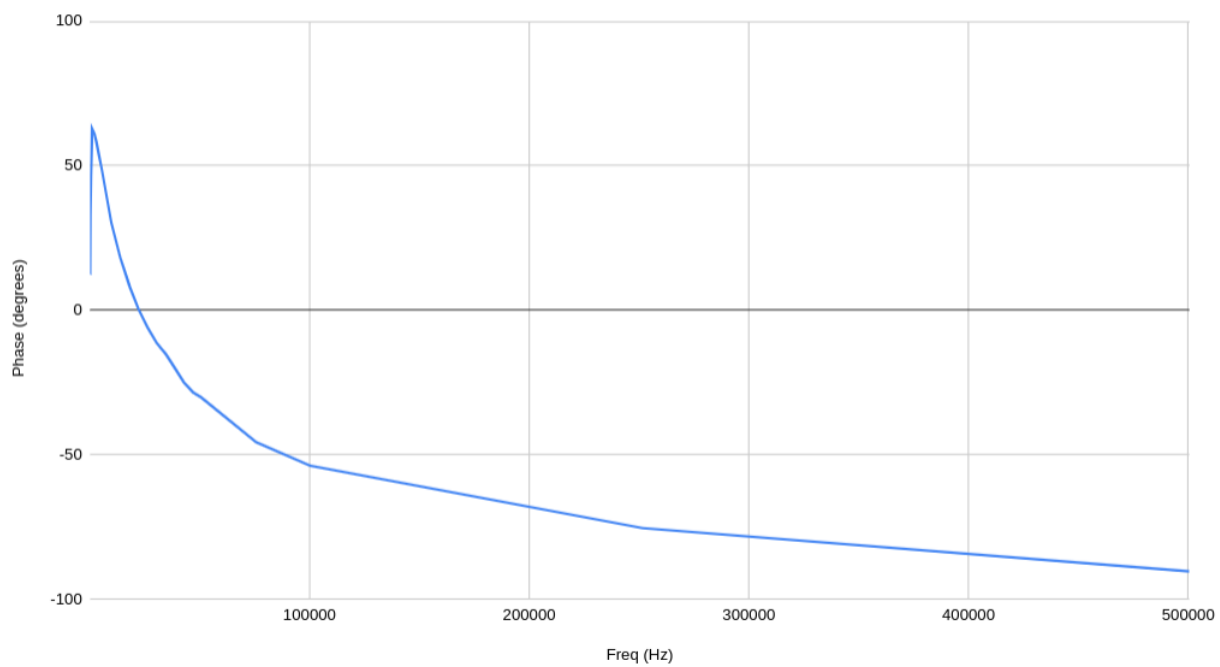
Part 2: Parallel Resonant Circuit

Parallel	985.2			
Freq (Hz)	V _s (v)	V _o (v)	Phase (degrees)	I _s (mA)
104	8.0	0.3	12.3	7.815671945
307	8.0	0.3	33.2	7.815671945
507	8.0	0.4	46.5	7.714169712
1040	8.0	0.6	62.8	7.511165246
2070	8.0	1.1	61	7.00365408
3010	8.0	1.5	58.3	6.597645148
4050	8.0	1.8	54	6.293138449
5540	8.0	2.3	48.5	5.785627284
9760	8.0	3.2	30.4	4.872107186
13880	8.0	3.6	18.2	4.466098254
18020	8.0	3.8	8.4	4.263093788
22180	8.0	4	0.3	4.060089322
26330	8.0	4	-6	4.060089322
30500	8.0	3.9	-11.4	4.161591555
34660	8.0	3.9	-15.3	4.161591555
38880	8.0	3.8	-20.3	4.263093788
42970	8.0	3.7	-25.1	4.364596021
47130	8.0	3.6	-28.5	4.466098254
50550	8.0	3.5	-30.1	4.567600487
75700	8.0	2.9	-45.7	5.176613886
100250	8.0	2.4	-53.8	5.684125051
251570	8.0	1.2	-75.4	6.902151847
500500	8.0	0.7	-90.4	7.409663013

Parallel Resonant Circuit: V_o (V) and I_s (mA) vs Freq (Hz)

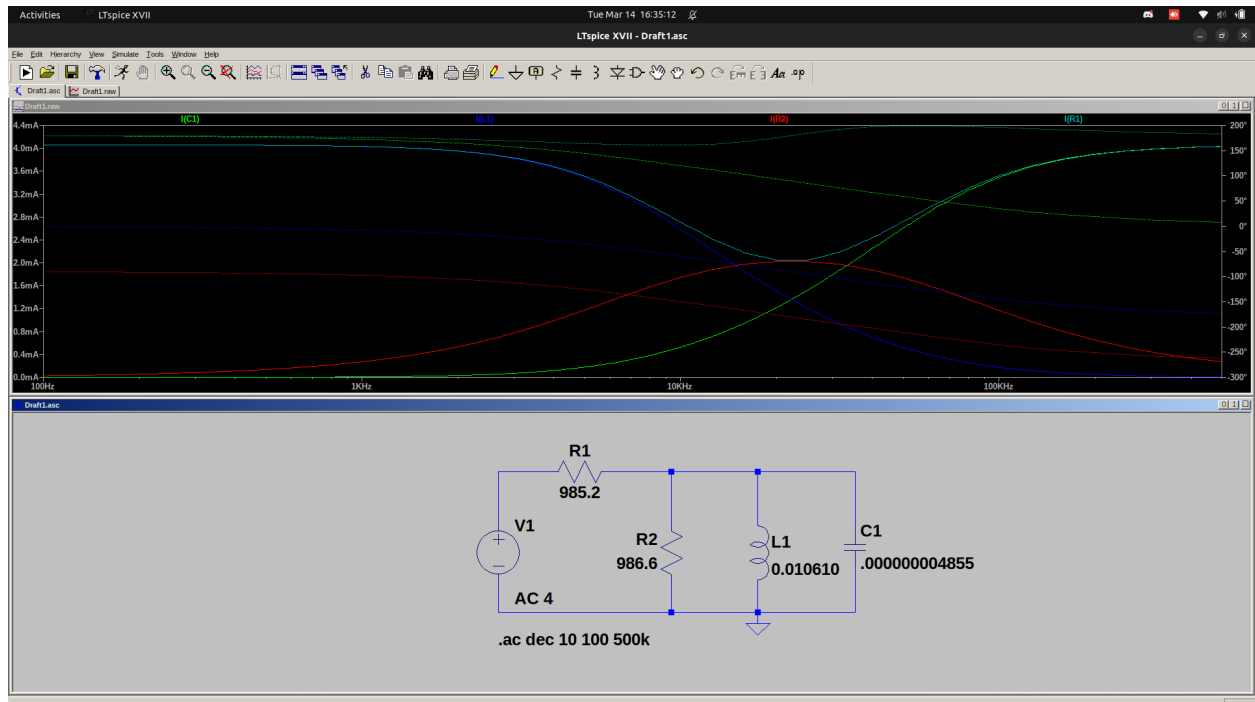


Parallel Resonant Circuit: Phase (degrees) vs. Freq (Hz)



Part 3: Parallel Resonant Circuit Verification with LTSpice

Current:



Voltage:

