

Lab 4 - Results: Phasors and AC Power

ECE202: *Electrical Circuits I*

Name	Student ID	CCID	Lab Section

Pre-lab Sign-off: _____ Results Sign-off: _____

Function Generator – (Z_{OUT})

Resistor Load – Decade Box					
Resistance - (Ω)	Open	100	50	20	Short
$V_{OUT} - (V^{RMS})$					
		Capacitor Load - $1\mu F$		Inductor Load – 2.5mH	
$f_{@50\Omega}$	(kHz)				
V_{OUT}	(V^{RMS})				
f_{OUT}	(kHz)				

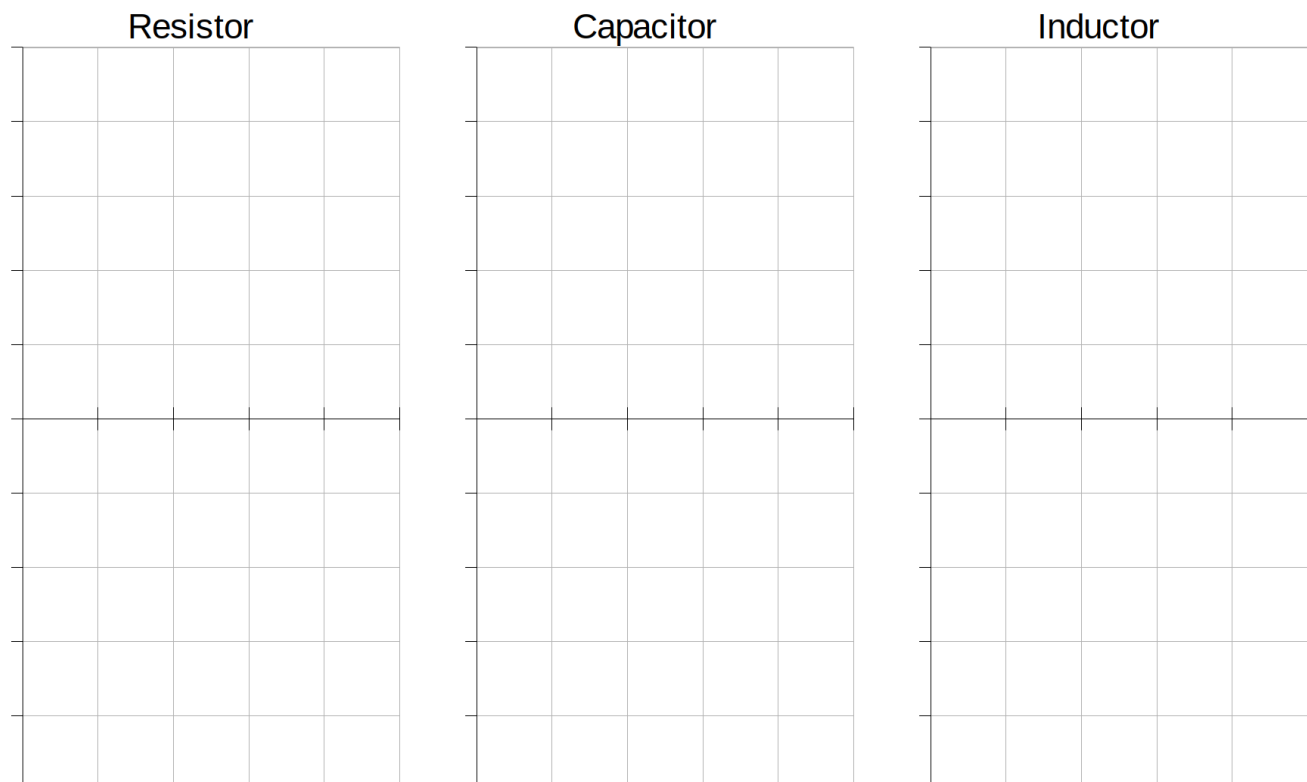
Scope vs. DMM – (RMS)

Attenuation		1	0.707	0.5	0.25
$V_{OUT} - \text{Calc} -$	(V^{RMS})	-			
$V_{OUT} - \text{DMM}$	(V^{RMS})				
$V_{OUT} - \text{Scope}$	(V^{RMS})				
f	(kHz)	1.0			

Phasors and AC Power - (RCL)

		Resistor - 200Ω	Capacitor - $1\mu\text{F}$	Inductor – 2.5mH
f	(Hz)	4.0k	796	12.7k
Z	(Ω)			
Period	(μs)			
V_{RMS}	(V)			
I_{RMS}	(mA)			
t_{V-I}	(μs)			
I (lead/lag) V	(lead/lag)			
θ	($^\circ$)			
Z	(Ω)			
S	(mVA)			
Q	(mVAR)			
P	(mW)			

Phasor Diagrams – Resistor, Capacitor, Inductor



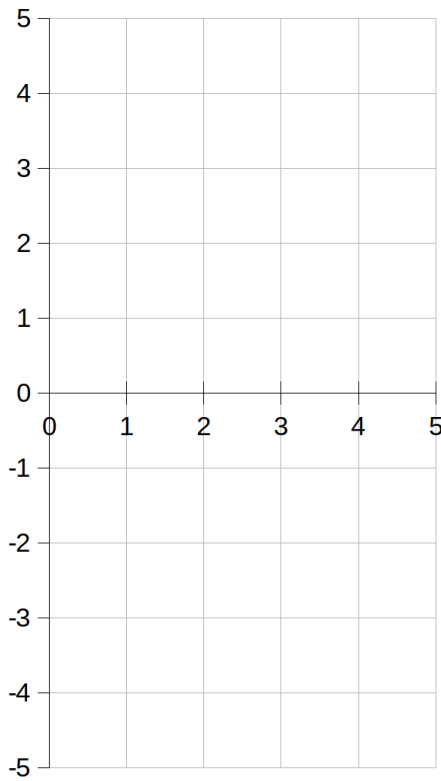
Series RLC Circuit – (KVL)

f_s	(kHz)	1.80	3.20	4.60
Z	(Ω)			
t_s	(μs)			
V_R	(V^{RMS})			
$I_s = (V_R \div 100)$	(mA)			
V_s	(V^{RMS})			
t_{R-S}	(μs)			
V_s angle - θ	($^\circ$)			
V_{RL}	(V^{RMS})			
t_{R-RL}	(μs)			
V_{RL} angle - δ	($^\circ$)			
V_L	(V^{RMS})			
V_L angle - α	($^\circ$)			
V_C	(V^{RMS})			
V_C angle - β	($^\circ$)			
Z	(Ω)			
S	(mVA)			
Q	(mVAR)			
P_s	(mW)			
P_R	(mW)			
$P_{LC(loss)}$	(mW)			

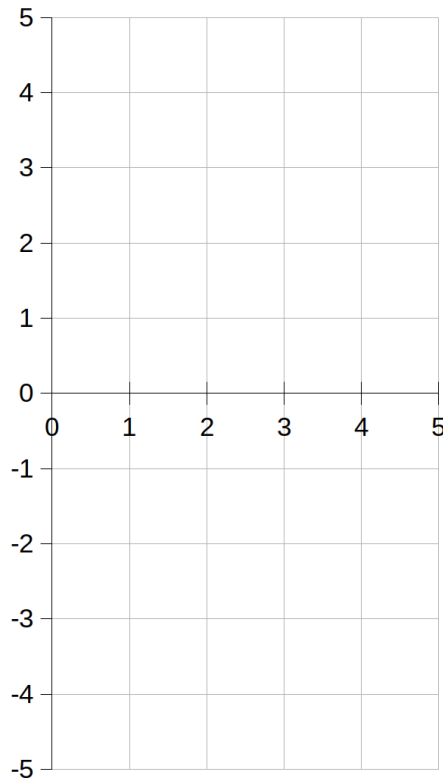
Series RCL Circuit - *Graphs*

Phasor Diagram - $V_R(ref)$, V_S , V_{RL} , V_L , V_C

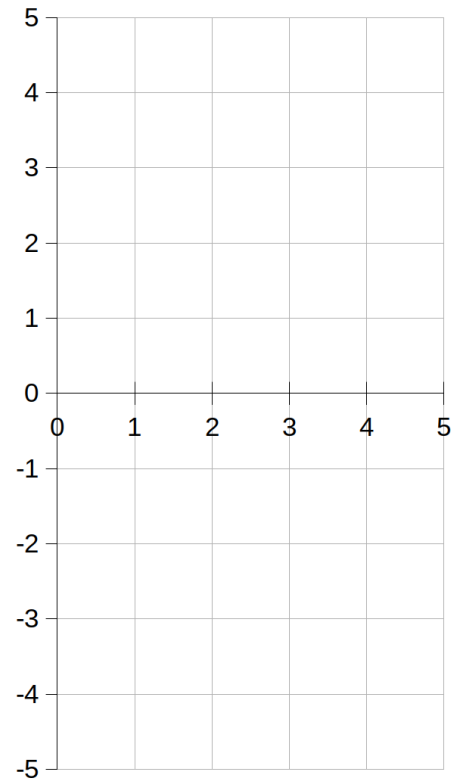
1.8 kHz



3.2 kHz

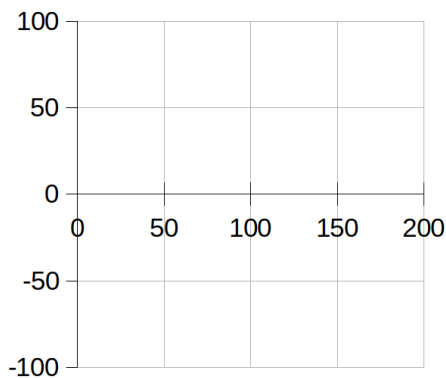


4.6 kHz

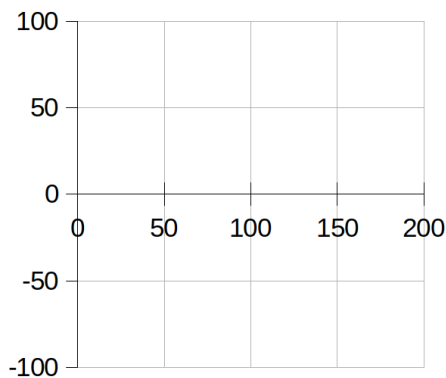


Power Triangle – S , Q , P_s

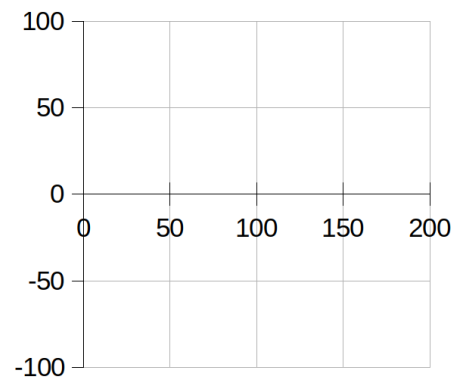
1.8 kHz



3.2 kHz



4.6 kHz

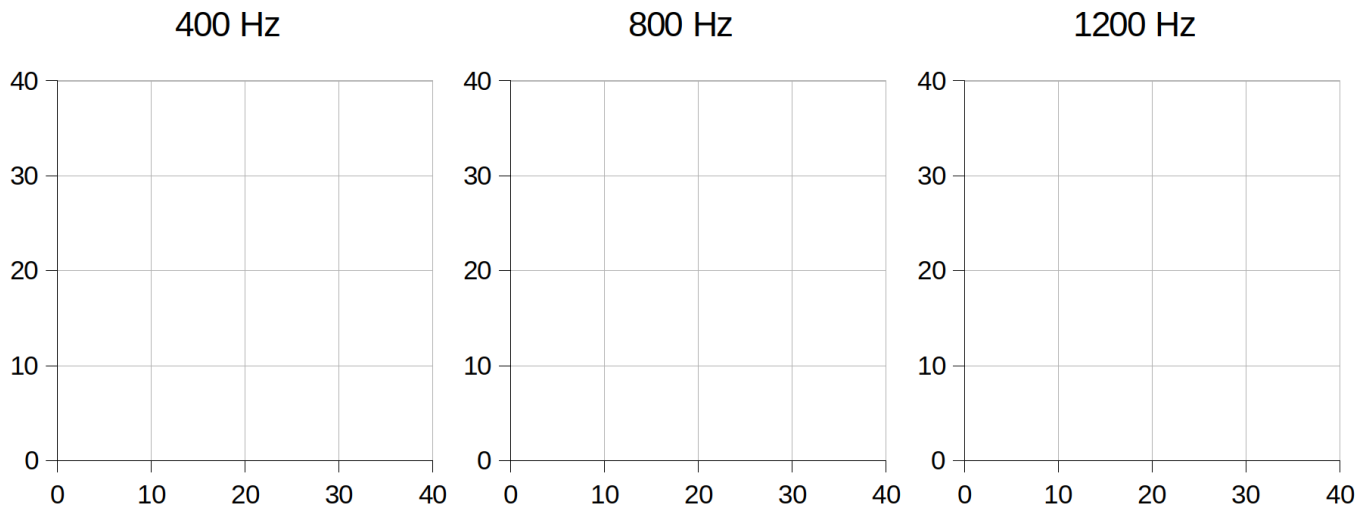


Parallel RC Circuit – (KCL)

f_s	(Hz)	400	800	1.20 k
Z	(Ω)			
t_s	(μs)			
V_R	(V^{RMS})			
I_R	(mA)			
I_C	(mA)			
t_{R-C}	(μs)			
I_C angle - δ	($^\circ$)			
I_s	(mA)			
t_{R-S}	(μs)			
I_s angle - θ	($^\circ$)			
Z	(Ω)			
S	(mVA)			
Q	(mVAR)			
P	(mW)			

Parallel RC Circuit - *Graphs*

Phasor Diagram – $I_R(\text{ref})$, I_C , I_S



Power Triangle – S , Q , P

