

Experiment 4:

RC and RLC Circuits

In-Lab Report

A. Phase Shift Measurements

- Measure the phase shift between the input voltage and output voltage of the circuit in figure 1 using Y-T format and the X-Y format (lissajous)

Calculated Phase Shift		
Y-T Format Δ	T= 32 microsec	T=
Lissajous Figure	2B= 5	2A= 6

B. Lead and Lag Networks

- Measure and draw (using Paint) the output voltage of the lag and lead networks in figure 3 and 4 if a $1 V_{pk-pk}$ Square signal is applied to the input. Below are the frequencies.

Lead Network (Measured)		
Frequency	Input Voltage	Output Voltage
100Hz	$1 V_{pk-pk}$	0.98 V
1KHz	$1 V_{pk-pk}$	1.94 V
10KHz	$1 V_{pk-pk}$	1.3 V

Lag Network (Measured)		
Frequency	Input Voltage	Output Voltage
100Hz	$1 V_{pk-pk}$	1.08 V
1KHz	$1 V_{pk-pk}$	0.976 V
10KHz	$1 V_{pk-pk}$	0.288 V



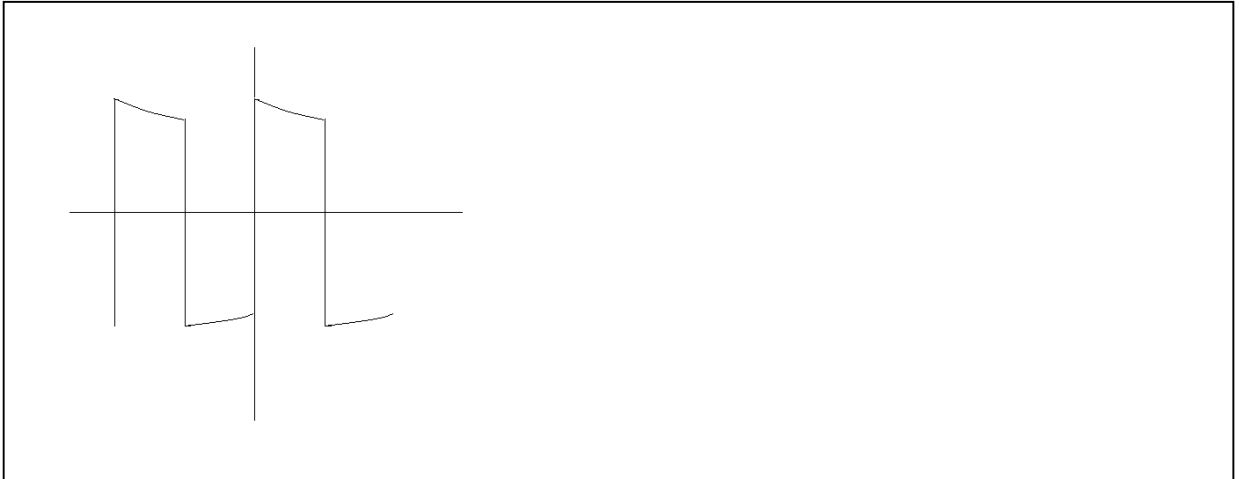
Lead 100Hz



Lead 1KHz



Lead 10KHz



Lag 100Hz



Lag 1KHz



Lag 10KHz

- Measure the output voltage of the lag and lead networks in figure 3 and 4 if a $1 V_{pk-pk}$ Sine signal is applied to the input. Below are the frequencies.

Lead Network (Measured)		
Frequency	Input Voltage	Output Voltage
100Hz	$1 V_{pk-pk}$	0.035 V
1KHz	$1 V_{pk-pk}$	0.496 V
10KHz	$1 V_{pk-pk}$	0.952 V

Lag Network (Measured)		
Frequency	Input Voltage	Output Voltage
100Hz	$1 V_{pk-pk}$	0.992 V
1KHz	$1 V_{pk-pk}$	0.848 V
10KHz	$1 V_{pk-pk}$	0.180 V

C. Series RLC circuits

- Measure the magnitude and phase angle of the output voltage for the following RLC circuits (figure 5) for an sinusoidal input voltage of 1 volt P_k-P_k

R=100Ω L=220μH C=1μF			
Frequency	$V_{IN} P_k-P_k$	$V_R P_k-P_k$	ΔT
1KHz	0.9 V	0.424 V	160 micro secs
1.4 KHz	0.86 V	0.488 V	90 micro secs
2 KHz	0.8 V	0.536 V	49 micro secs
2.8 KHz	0.744 V	0.568 V	28 micro secs
4 KHz	0.736V	0.6 V	12 micro secs
5.4 KHz	0.72 V	0.616V	7 micro secs
7.5 KHz	0.72 V	0.624 V	4 micro sec
10 KHz	0.72 V	0.624V	2 micro secs
14 KHz	0.72 V	0.632V	0 secs

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20 KHz	0.712 V	0.624V	2 micro secs
28 KHz	0.72V	0.616V	2 micro secs
40 KHz	0.736 V	0.6V	1.6 micro secs
54 KHz	0.76V	0.584V	2 micro secs
75 KHz	0.86 V	0.544V	1.4 micro secs
100 KHz	0.92V	0.488V	1.2 micro secs