

Experiment 4:

RC and RLC Circuits

Pre-Lab Report

A. Phase Shift Measurements

- Calculate the phase shift between the input voltage and output voltage of the circuit in figure 1

Calculated Phase Shift

- Briefly describe two methods for measuring phase shift in the lab

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B. Lead and Lag Networks

Calculate the output voltage of the lag and lead networks in figure 3 and 4 if a $1\text{ V}_{\text{pk-pk}}$ sinusoidal signal is applied to the input. Below are the frequencies

Lead Network		
Frequency	Input Voltage	Output Voltage
100Hz	1 V_{PK-PK}	
1KHz	1 V_{PK-PK}	
10KHz	1 V_{PK-PK}	

Lag Network		
Frequency	Input Voltage	Output Voltage
100Hz	1 V_{PK-PK}	
1KHz	1 V_{PK-PK}	
10KHz	1 V_{PK-PK}	

C. Series RLC circuits

- Calculate the resonant frequency for the following RLC circuits (figure 5)

Resistance	Inductor	Capacitor	Resonant Frequency
10 Ω	220 μH	1 μF	
100 Ω	220 μH	1 μF	
10 Ω	470 μH	1 μF	
10 Ω	470 μH	0.1 μF	

- What is the Phase angle between the input voltage and output voltage at resonance

Phase Angle