

ECE 209L - SECOND ORDER CIRCUITS - LAB 11

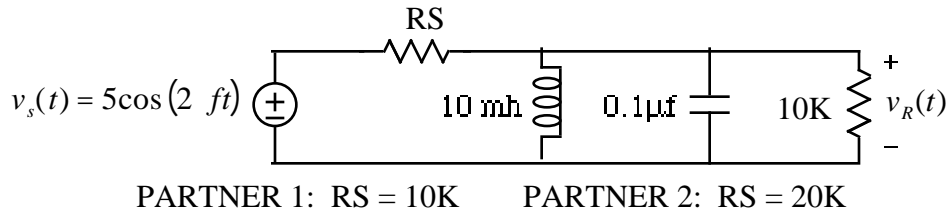
FREQUENCY RESPONSES OF RLC PARALLEL CIRCUITS

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OBJECTIVE

The objective of this lab is to see how the amplitude of the sinusoidal steady state response of the following second order RLC parallel circuit varies as a function of frequency



LAB

1. **Prelab** - Obtain and measure your resistor and capacitor values. Then compare your nominal and measured values. Put your results in a Table
2. Measure the value of the inductor supplied in the lab
3. Describe what you see happening to the amplitude of $v_R(t)$ as you increase the frequency of $v_s(t)$. Illustrate with graphs of $v_R(t)$
4. Explain why the amplitude of the sinusoidal steady state response of $v_R(t)$ behaves the way it does as you increase the frequency
5. Measure the resonance frequency f_p of the circuit
6. Calculate the resonance frequency of your parallel RLC circuit with the equation $f_p = \frac{1}{2\sqrt{LC}}$
7. Compare your measured and calculated values of the resonance frequency f_p
8. Measure $v_R(t)$ and then calculate $|G(j2 f)| = |V_R(j2 f)/V_s|$ at representative frequencies
9. **Prelab** - Draw the phasor circuit for your measured values (with $L = 10$ mh) and then calculate the transfer function $G(j\omega) = V_R(j\omega)/V_s$
10. **Prelab** - Make use of your transfer function in Problem (9) to obtain a Mathcad graph of the transfer function $|G(j2 f)| = |V_R(j2 f)/V_s|$ with f on a log scale
11. **Prelab** - Describe your frequency response graph in Problem (10). Is the circuit lowpass, highpass or bandpass
12. Add your data points to your graph in Problem (10). How well do your data points agree with the calculated values of the graph