

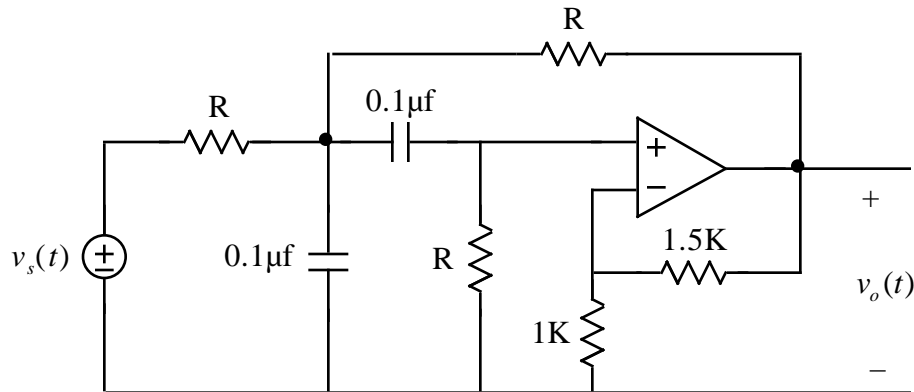
# ECE 209L - SECOND ORDER CIRCUITS - LAB 12 FREQUENCY RESPONSES OF RC-ACTIVE CIRCUITS

FALL 2003

A.P. FELZER

## OBJECTIVE

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



PARTNER 1:  $R = 2.5K$  PARTNER 2:  $R = 4.7K$

## 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. Describe what you see happening to the amplitude of  $v_o(t)$  as you increase the frequency of  $v_s(t)$ . Illustrate with graphs of  $v_o(t)$
3. Measure  $v_o(t)$  and then calculate  $|G(j2 f)| = |V_o(j2 f)/ V_s|$  at representative frequencies including the center frequency  $f_p$
4. **Prelab** - Draw the phasor circuit for your measured values and then calculate the transfer function  $G(j\omega) = V_o(j\omega)/ V_s$
5. **Prelab** - Make use of your transfer function in Problem (4) to obtain a Mathcad graph of the transfer function  $|G(j2 f)| = |V_o(j2 f)/ V_s|$  with  $f$  on a log scale
6. **Prelab** - Describe the frequency response graph in Problem (5). Is the circuit lowpass, highpass or bandpass
7. **Prelab** - Make use of your graph in Problem (5) to find the center frequency  $f_p$  of the circuit
8. Add your data points to your graph in Problem (5). How well do your data points agree with the calculated value of the graph
9. Compare the measured and calculated values of the center frequency  $f_p$