

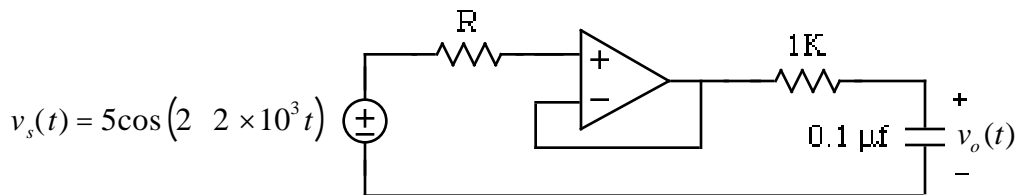
ECE 209L - SINUSOIDAL STEADY STATE RESPONSES - LAB 3 POSITIVE GAIN OP AMP CIRCUIT

FALL 2003

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OBJECTIVE

The objective of this lab is to first measure the sinusoidal steady state response of $v_o(t)$ in the following first order RC-Active circuit and then compare the result with calculated values



PARTNER 1: R = 1K PARTNER 2: R = 2K

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. **Prelab** - What affect does R have on the sinusoidal steady state response of $v_o(t)$. Why
3. Build the circuit and then draw $v_s(t)$ and $v_o(t)$ on the same graph from what you observe on the scope
4. **Prelab** - Obtain the differential equation for $v_o(t)$ for your circuit element values. Then solve your differential equation for the sinusoidal steady state response (the forced response) by substituting in

$$v_f(t) = A \cos(2 \times 10^3 t + \theta) = \text{Re} \left[V_o(j2 \times 10^3) e^{j2 \times 10^3 t} \right]$$

and solving for the phasor $V_o(j2 \times 10^3) = A e^{j\theta}$

5. **Prelab** - Make use of Mathcad to obtain a graph of $v_s(t)$ and the steady state $v_o(t)$ on the same graph
6. Compare your graphs in Problems (3) and (5)
7. Measure the magnitude and phase of $v_o(t)$. Then use your results to write an equation for $v_o(t)$
8. Compare your measured values for A and θ in Problem (7) with your calculated results in Problem (4). Put your results in a Table