ECE 207L - REVIEW OF RESISTOR CIRCUITS - LAB 1
BASIC SCOPE OPERATION

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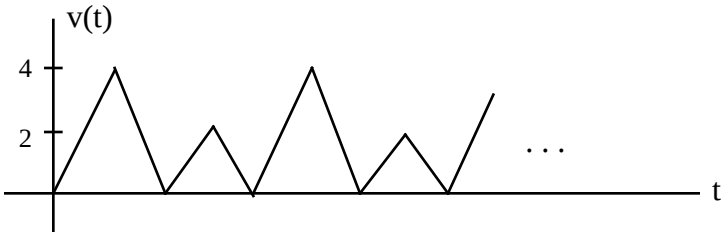
OBJECTIVE

The objective of this lab is to review basic scope operation

PRELAB

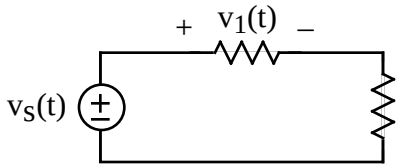
Read the notes in the Lab Manual on scopes and answer the following questions:

1. Sketch what you'll see on the scope for the following signal



if the trigger level is 3 volts and the slope positive

2. Describe how to measure a "floating voltage" like $v_1(t)$ in the following circuit



with a dual trace scope. Make a drawing showing the location of the scope probes.

LAB

1. Turn the scope ON and get a trace - a straight line across the screen. What does the sec/div control tell us.

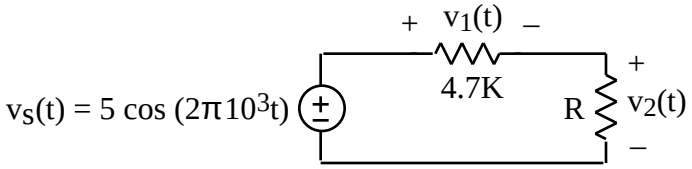
2. Make use of your BNC to clip connectors to connect the scope to the sinusoidal signal generator
   a. Describe what happens to the value of the sinusoid being displayed on the scope at t = 0 as you vary the trigger level. Draw pictures to illustrate what you see when the trigger level is 1 volt and when it's -1 volt.
   b. Describe what happens to the value of the sinusoid being displayed on the scope at t = 0 when you change the slope control. Draw pictures to illustrate what you see.
   c. Calculate the frequency of your sinusoid from what you see on the scope. Show your calculations.
   d. What does the scope give for the frequency of your sinusoid.
   e. Compare your measured and calculated values in parts (c) and (d) for the frequency of the sinusoid. As usual put your results in a Table with one column for the percentage difference.
   f. Calculate the amplitude of your sinusoid from what you see on the scope. Show your calculations.
   g. What does the scope give for the amplitude of your sinsuoid.
   h. Compare your measured and calculated values in parts (f) and (g) for the amplitude of the

sinusoid.

i. Make use of your results to write an equation for your v(t)

3. Display the signal $v_S(t) = 2 + 5 \cos(2\pi 1000t)$ equal to a sinusoid plus a DC offset on the scope.
   a. Draw pictures to illustrate what you see for the settings as the offset is varied
      (i). AC
      (ii). DC
      (iii). GND
   b. For which of the settings AC or DC do you see the affect of varying the offset and which not
   c. Describe how to measure the DC offset A of a signal like $v(t) = A + B\cos(100t)$

4. Given the following circuit



PARTNER 1: R = 2K PARTNER 2: R = 10K

   a. Measure your resistors. Compare with their nominal values – the values specified by the color code
   b. Use your scope to measure $v_1(t)$ and $v_2(t)$
   c. Use voltage division to calculate $v_1(t)$ and $v_2(t)$ for your circuit
   d. Compare your calculated and measured amplitudes of $v_1(t)$ and $v_2(t)$