ECE 207L - FIRST ORDER RC CIRCUITS - LAB 10
FIRST ORDER RC CIRCUITS WITH CONSTANT INPUTS

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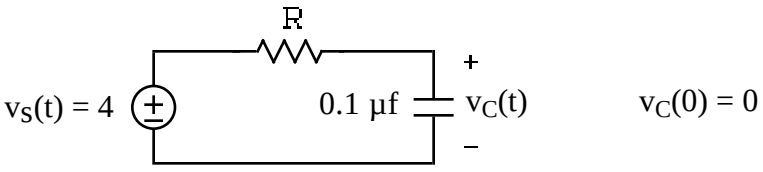
OBJECTIVE

The objective of this lab is to display on our scopes the complete responses of first order RC circuits to constant inputs

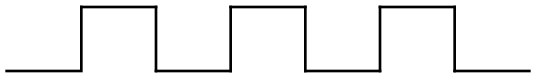
LAB

1. Given the following first order RC circuit



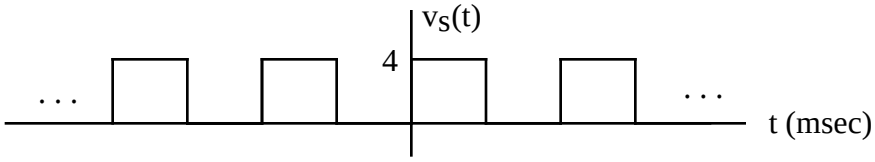
PARTNER 1: R = 1K PARTNER 2: R = 2K

a. Measure your resistor and capacitor values. Compare with nominal values.
b. Sketch what you expect $v_C(t)$ to look like.
c. Now explain why we have to make the input $v_S(t)$ a pulse train as follows



in order to be able to see the transient response of $v_C(t)$ on our scopes.

d. Make use of the DC offset on the signal generator to obtain a 1 KHz pulse train of magnitude 4 if you are PARTNER 1 and a 500 Hz pulse train of magnitude 4 if you are PARTNER 2 as follows



Display your $v_S(t)$ on Trace 1 and your $v_C(t)$ on Trace 2. Then carefully sketch $v_S(t)$ and $v_C(t)$ to scale. Measure $v_C(t)$ at t = 0, 0.1, 0.2, . . ., 0.5 msec if you are PARTNER 1 and at t = 0, 0.2, 0.4, . . . , 1 msec if you are PARTNER 2

e. Calculate $v_C(t)$ for a constant input of magnitude 4 volts assuming zero initial conditions. And then make use of your result to calculate $v_C(t)$ t = 0, 0.1, 0.2, . . ., 0.5 msec if you are PARTNER 1 and at t = 0, 0.2, 0.4, . . . , 1 msec if you are PARTNER 2
f. Compare your calculated and measured values of $v_C(t)$
g. What happens to $i_C(t)$ as $v_C(t)$ increases