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# ECE53A: Fundamentals of Electrical Engineering

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## Laboratory Assignment 3 : Low Pass RC Lines Winter 2008

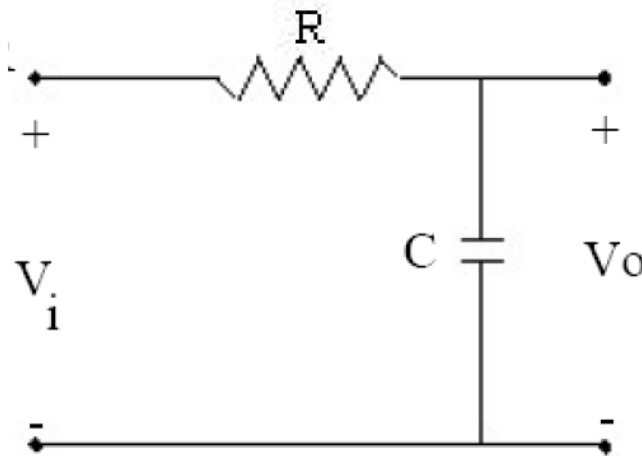
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*Note: You must do the design and simulation (parts A and B) before coming to the Lab.*

**Purpose:** To design, simulate, build, and test RC lines.

**Part A:** Design an RC line for signal communication:

- 1) Use a 22 nF capacitor (good quality capacitors with this value is available).
- 2) Connect a resistor R with three different values 0.1K, 1K and 10K ohm.



Set the function generator to give a square wave at about 50K Hz with a peak-to-peak magnitude of 10 V. Expand the horizontal display of the scope to show the rising edge of the output signal. Print the output signal. Estimate the time constant of the circuit from the output rise time. Write down the step response of the circuit and calculate its time constant. Compare theoretical value with experimental measurement and report any differences. Use a table to list the results of three different resistances.

Use PSpice to simulate the step response of the RC circuit. This is done by using VPULSE function in PSpice. Plot the results (one period of the wave) and compare with your experimental results and theoretical calculations.

**Part B:** Cascade the two RC line into two stages, i.e. the output port of the first line connects the input port of the second. Thus, the input port of the first line and output port of the second become the input and output ports of the cascaded line. Repeat Part A.

