

**ECE 207L - SECOND ORDER CIRCUITS - LAB 23**  
**STEP RESPONSES OF 2ND ORDER RLC CIRCUITS - PART III**

FALL 2003

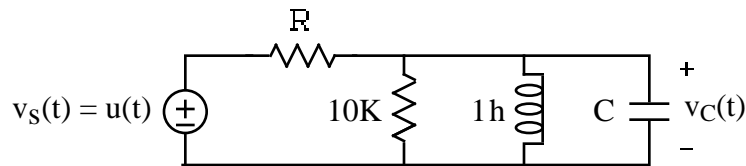
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**OBJECTIVE**

The objective of this lab is to observe the step responses of underdamped and overdamped 2nd order parallel RLC circuits.

**PRELAB**

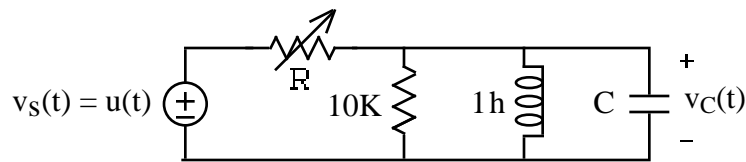
Given the following parallel RLC circuit



1. Choose a value of  $R$  that makes the circuit overdamped
2. Calculate the step response of  $v_C(t)$
3. Make use of a computer program like Mathcad to obtain a plot of  $v_C(t)$

**LAB**

1. Given the following parallel RLC circuit



- a. Describe what happens to the step response as the resistor  $R$  increases from a small value to a large value. Illustrate with sketches that indicate the size of the resistor.
- b. Compare how the size of the resistor  $R$  affects the responses of series and parallel RLC circuits
2. For the circuit you designed in the prelab
  - a. Measure the values of the circuit elements for the circuit you designed in the prelab. Compare with nominal values
  - b. Sketch the step response of  $v_C(t)$  from what you see on the scope
  - c. Measure at least five "representative" values of the step response from what you see on the scope.
  - d. Plot your data on your graph from the prelab
  - e. Compare your measured and calculated values of  $v_C(t)$