

ECE 207L - SECOND ORDER CIRCUITS - LAB 22 STEP RESPONSES OF 2ND ORDER RLC CIRCUITS - PART II

FALL 2003

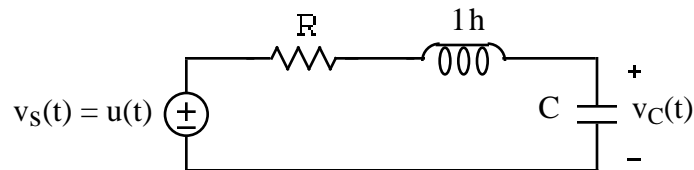
A.P. FELZER

OBJECTIVE

The main objective of this lab is to measure the step responses of overdamped 2nd order series RLC circuits.

PRELAB

Given the following series RLC circuit

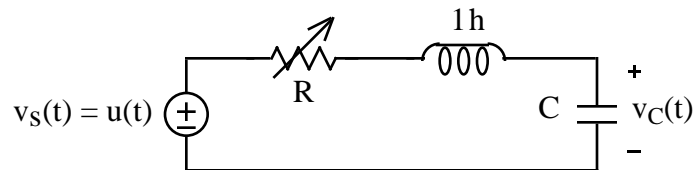


PARTNER 1: $C = 0.1\mu\text{f}$ PARTNER 2: $C = 0.2\mu\text{f}$

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. Describe what you see happening to $v_C(t)$ in the following series RLC circuit



PARTNER 1: $C = 0.1\mu\text{f}$ PARTNER 2: $C = 0.2\mu\text{f}$

as the resistor R increases from a small value to a large value and the circuit goes from underdamped to overdamped. Illustrate with sketches that indicate the size of the resistor.

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 $v_C(t)$