

ELCT 222

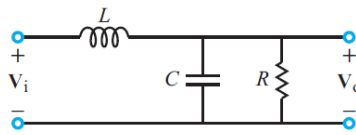
Signals and Systems

Computer Assignment 5

Notes:

- Unclear or illegible work will not receive full credit.
- Label all sketches and plots completely and clearly.
- Where appropriate, “box in” your final answer.

Suppose you build the following circuit producing an output signal $v_o(t)$ by filtering the input signal $v_i(t)$ in the lab.



1. (50 pts) Express the transfer functions $H(s) = \frac{V_o(s)}{V_i(s)}$ for each case (as a function of the circuit elements)
2. (25 pts) Express and (25 pts) plot the step response $y_{\text{step}}(t)$ of each circuit (for $t \in [-1, 10]$) by using the corresponding step function for
 - a. Case 1: $C = 1, L = 1, R = \frac{1}{2}$
 - b. Case 2: $C = 0, L = 1, R = 1$
 - c. Case 3: $C = 1, L = 0, R = 1$
 - d. Case 4: $C = 1, L = 1, R = \infty$