University of Portland
School of Engineering

EE 262
Spring 2012
A. Inan

Homework # 3—Linear Time-Invariant (LTI) Systems
(Assigned: Wednesday, February 8, 2012)
(Due date: Wednesday, February 15, 2012, 1:35p.m.)

These problems are assigned from <u>Introduction to Signal and System Analysis</u> by Gopalan (pages 144-148):
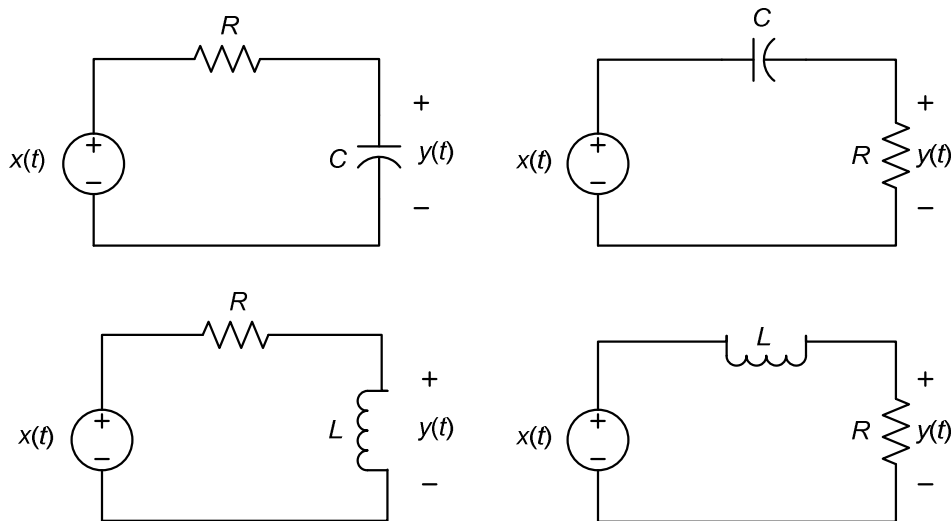
> **3.1. CT LTI system.**
> **3.6. CT LTI system.**
> **3.8. CT LTI system.**
> **3.14. Step and impulse responses of a CT LTI system.**

The following two homework problems are additional to the above prepared by A. Inan:

Problem # 5. LTI System. Find the unit-step response $y_s(t)$, impulse response $h(t)$, and unit-ramp response $y_r(t)$ of each of the following first-order electric circuits shown.

Problem # 6. Impulse response of an LTI system. For each impulse response corresponding to an LTI system, determine whether the corresponding system is (i) memoryless, (ii) causal, and (iii) BIBO stable. Justify your answers.

(a) $h(t) = u(t+1) - 2u(t-2) + u(t)$.
(b) $h(t) = 2e^{-|t|}$
(c) $h(t) = 3e^{-t}u(t-1)$.
(d) $h[n] = (2/3)^n u[n]$.

Please use the following guidelines for your homework solutions:
1) On the first sheet, at the top, indicate that this is EE 262/Spring 2012/HW #3 Solutions and provide your name somewhere on that sheet where the grader can easily see it.
2) Solve each problem on a separate sheet unless there is a solution which is very short.
3) Do not use the back of the sheets unless you have to.
4) Staple your solutions in the above order before you turn them in.
Please turn in your homework on time. The solutions for each homework assignment will be provided as a separate handout on the due date.

An Early, However, Extremely-Important Reminder Note:
EE 262—Midterm Exam # 1 is scheduled for Friday, February 17, 2012
(It is a closed-book exam, however, a single formula sheet will be allowed.)