GEORGIA INSTITUTE OF TECHNOLOGY
School of Electrical and Computer Engineering

ECE 4270

Fundamentals of Digital Signal Processing

Assigned: Thursday, Jan. 12, 2017
Due: Thursday, Jan. 19, 2017

Problem Set #1

Note that all the problems are from the **Second** edition of Oppenheim and Schafer.

Problem 1.1: Work Oppenheim and Schafer Problem 2.21 on page 74.

Problem 1.2: Work Oppenheim and Schafer Problem 2.22 on page 74.

Problem 1.3: Work Oppenheim and Schafer Problem 2.25 on page 75.

Problem 1.4: Work Oppenheim and Schafer Problem 2.30 on page 76.

Problem 1.5: The system L in Figure 1 is known to be **linear**. Shown are three output signals, $y_1[n]$, $y_2[n]$, and $y_3[n]$, in response to the input signals $x_1[n]$, $x_2[n]$, and $x_3[n]$, respectively.

(a) Determine whether the system L could be time invariant.

(a) If the input $x[n]$ to the system L is $\delta[n]$, what is the system response $y[n]$?
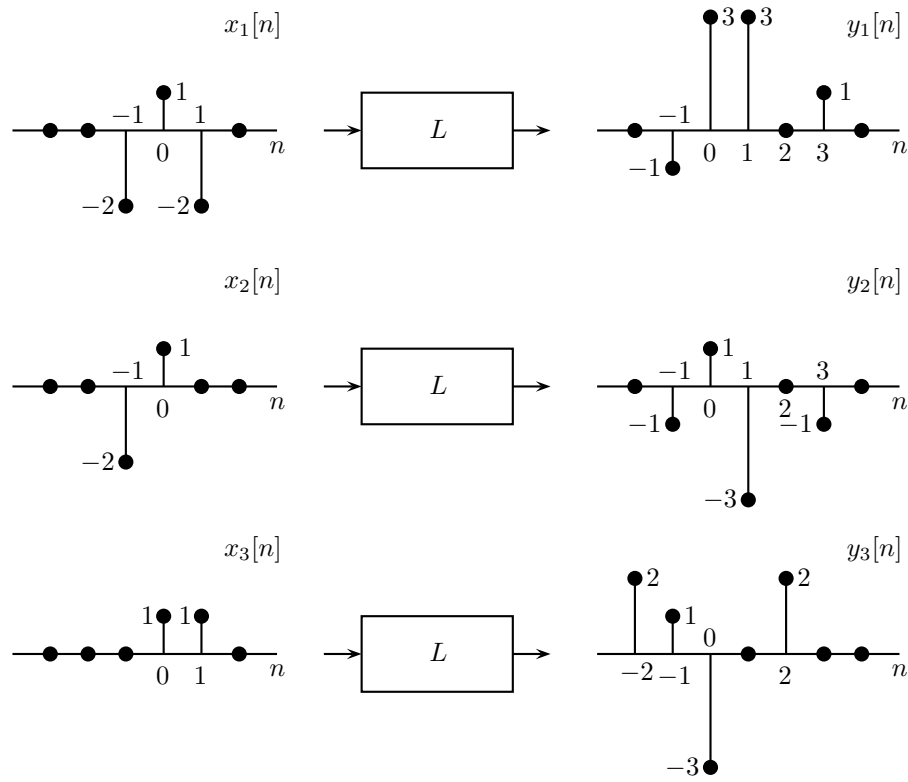
$x_1[n]$

L

$y_1[n]$

$x_2[n]$

L

$y_2[n]$

$x_3[n]$

L

$y_3[n]$

Figure 1:

2