SEAS WINTER 2020
Semester-6
Digital Signal Processing

LAB 2

Objectives:

Understand different concepts of convolutions along with its applications.

Prerequisites:

- Linear Convolution
- Cross- Correlation and Auto-correlation

Problems

1. Find the linear convolution of following **finite length sequences** using available command and also without command by developing your own function. Plot required outputs along with input sequence.

   a. $x(n) = \{1,\underset{\uparrow}{2},2,1\}$

      $h(n) = \{1,-1,\underset{\uparrow}{2}\}$

   b. $x(n) = \{-2,0,1,\underset{\uparrow}{-1},3\}$

      $h(n) = \{1,\underset{\uparrow}{2},0,-1,\}$

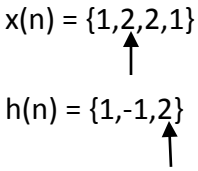
   c. $x(n) = \{1,2,3,\underset{\uparrow}{1}\}$

      $h(n) = \{\underset{\uparrow}{1},2,1,-1\}$

   d. $x(n) = \{9,1,5,4\}$

      $h(n) = \{0,\underset{\uparrow}{2},2\}$

2. Find cross-correlation between two sequences using available command and also without command by developing your own function. Verify your program for following sequence and Plot required outputs.



3. Find Auto-correlation of **finite length sequences** using available command and also without command by developing your own function. Plot required outputs along with input sequence

4. Find the linear convolution for following **<u>infinite length sequences</u>** and Plot required outputs.

   <u>Note:</u> Develop such function which can take index value from user for a given signal. You can also use previously developed functions.

   a. X(n) = u(n), h(n) = u(n)

   b. X(n) = cos $(2n\pi/4)$ u(n) , h(n) = u(n)