**Linear Convolution of Two sequences**

**AIM:** To obtain Linear Convolution of two finite length sequences

## Software: MATLAB THEORY:

Convolution is a mathematical operation used to express the relation between input and output of an LTI system. It relates input, output and impulse response of an LTI system as

y(n)=x(n)∗h(n)

A black and white math equation

Description automatically generated

Where y (n) = output of LTI

x (n) = input of LTI

h (n) = impulse response of LTI

By using convolution we can find zero state response of the system.

## Algorithm:

Step I: Give input sequence x[n].

Step II: Give impulse response sequence h(n)

Step III: Find the convolution y[n] using the matlab command conv. Step IV: Plot x[n],h[n],y[n].

## PROGRAM:

clc; clear all; close all;

x1=input('Enter the first sequence x1(n) = '); x2=input('Enter the second sequence x2(n) = '); L=length(x1);

M=length(x2); N=L+M-1;

yn=conv(x1,x2);

disp(‘The values of yn are= ‘); disp(yn);

n1=0:L-1;

subplot(311); stem(n1,x1); grid on; xlabel('n1--->');

ylabel('amplitude--->'); title('First sequence');

n2=0:M-1;

subplot(312); stem(n2,x2); grid on; xlabel('n2--->');

ylabel('amplitude--->');

title('Second sequence');

n3=0:N-1;

subplot(313); stem(n3,yn); grid on; xlabel('n3--->');

ylabel('amplitude--->'); title('Convolved output');

## Output:

Enter the first sequence x1(n) = [1 2 3 4 5]

Enter the second sequence x2(n) = [5 8 3 5 4 6] The values of yn are=

5 18 34 55 80 81 59 59 44 30

## OUTPUT WAVEFORMS:

## 

## VIVA QUESTIONS:

* 1. Explain the significance of convolution.
  2. Define linear convolution.
  3. Why linear convolution is called as a periodic convolution?
  4. Why zero padding is used in linear convolution?
  5. What are the four steps to find linear convolution?
  6. What is the length of the resultant sequence in linear convolution?
  7. How linear convolution will be used in calculation of LTI system response?
  8. List few applications of linear convolution in LTI system design.
  9. Give the properties of linear convolution.
  10. How the linear convolution will be used to calculate the DFT of a signal?

## Exercise:

1. Find the linear convolution of x(n)=[7 5 4 0] and h(n)=[0 3 6 2 9]