Republic of Iraq

Ministry of Higher Education

and Scientific Research

Al-Mustaqbal University College

Computer Engineering Techniques Department

(عملي)

Subject: Digital Signal Processing

Third stage

Experiment No. 7

By

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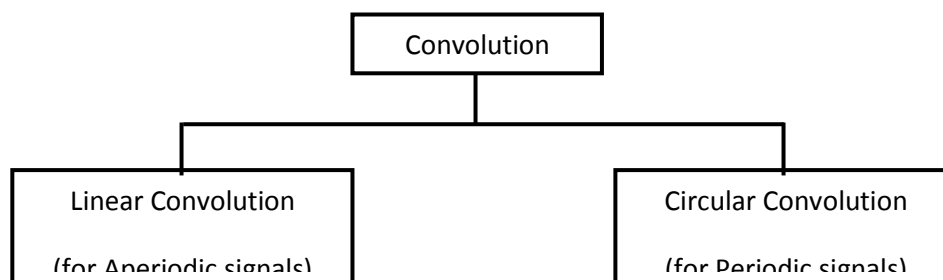
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Experiment No.7

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Name of Experiment: linear convolution

Aim: compute linear convolution of two given sequences.

Theory:-

      Convolution is an operation between the input signal to a system, and its impulse response, resulting in the output signal. Convolution of two signals involves summing the product of the two signals – where one of the signals is "flipped and shifted". It doesn't matter which signal is flipped and shifted . Convolution can be classified into two categories according to the signals that will convolved as shown in the figure.

```
                    ┌──────────────┐
                    │  Convolution │
                    └──────┬───────┘
              ┌────────────┴────────────┐
    ┌─────────────────────┐    ┌─────────────────────┐
    │  Linear Convolution  │    │  Circular Convolution │
    │                      │    │                      │
    │ (for Aperiodic signals)   │ (for Periodic signals) │
    └─────────────────────┘    └─────────────────────┘
```

Procedure:

```
clear all;
close all;
clc;
x1 = input ('enter the first sequence ');
subplot (2,2,1);
stem (x1,'r');
ylabel ('amplitude');
title ('plot of the first sequence');
grid on;
x2 = input ('enter 2nd sequence ');
```

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```
subplot (2,2,2);
stem (x2, 'r');
ylabel ('amplitude');
title ('plot of 2nd sequence');
grid on;
f = conv (x1,x2);
disp ('output of linear conv is');
disp (f);
subplot (2,2,3);
stem (f,'r');
xlabel ('time index n');
ylabel ('amplitude f');
title('linear conv of sequence');
grid on;
```

Result: