
# Rajshahi University of Engineering and Technology

## DEPT. of Electrical and Computer Engineering

**Course No:** ECE 4124

**Course Title:** Digital Signal Processing Sessional

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1. **Experiment No:** 01
2. **Experiment Date:** 19.03.2023

3. **Experiment Name**: Implementation of convolution of two signals,
   a) using Conv. Function
   b) without using Conv. Function

4. **Theory:**

In the experiment, we worked with continuous and discrete signals. A signal that varies smoothly and continuously over time is referred to as a continuous-time signal. These signals represent a quantity of interest that is influenced by an independent variable, usually considered as time. A discrete-time signal is a sequence of values of interest, where the integer index can be thought of as a time index, and the values in the sequence represent some physical quantity of interest.

The Conv. function converts a number from one numeric base system to another, and returns the result as a string value. The convolution of two vectors, u and v, represents the area of overlap under the points as v slides across u. Algebraically, convolution is the same operation as multiplying polynomials whose coefficients are the elements of u and v.

5. **Required Software: MATLAB**

6. **Code with Output:**

With Conv. Function:

```
clc;
clear all;
close all;

x = [1 2 3 4];
h = [4 4 3 2];
n = -4:1:4;
w = conv(x,h)
stem(w)
```

Output:

```
w =

     4    12    23    36    29    18     8

fx >>
```

Without Conv. Function:

```
clc;
clear all;
close all;
```

```
l = input('Input L: ');
m = input('Input M: ');
x = input('Input Matrix x: ');
h = input('Input Matrix h: ');
num = l+m-1;
n = -4:1:3;

for i = 1:num
y(i) = 0;
for j = 1:m
if (i>m)
h(i) = 0;
end
if (i-j+1>0)
y(i) = y(i)+x(j)*h(i-j+1);
else
end
end
figure(1)
subplot(num, 1, i)
stem(y(i))
end
y
figure(2)
stem(y)
```

Output:

```
Input L: 4
Input M: 4
Input Matrix x: [1 2 3 4]
Input Matrix h: [4 4 3 2]

y =

     4    12    23    36    29    18     8
```

## 7. Graphs:

With Conv. Function:

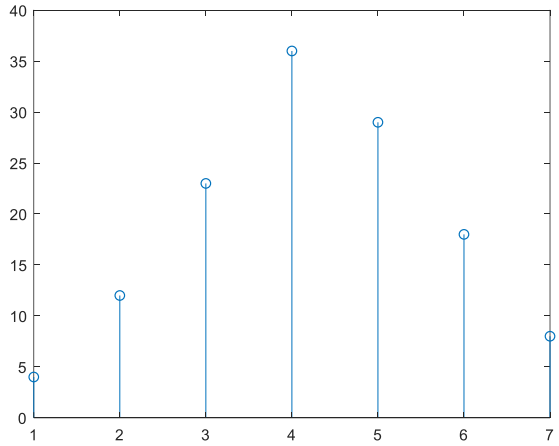


Fig.1.1 Convolution of two signals with Conv. Function

Without Conv. Function:

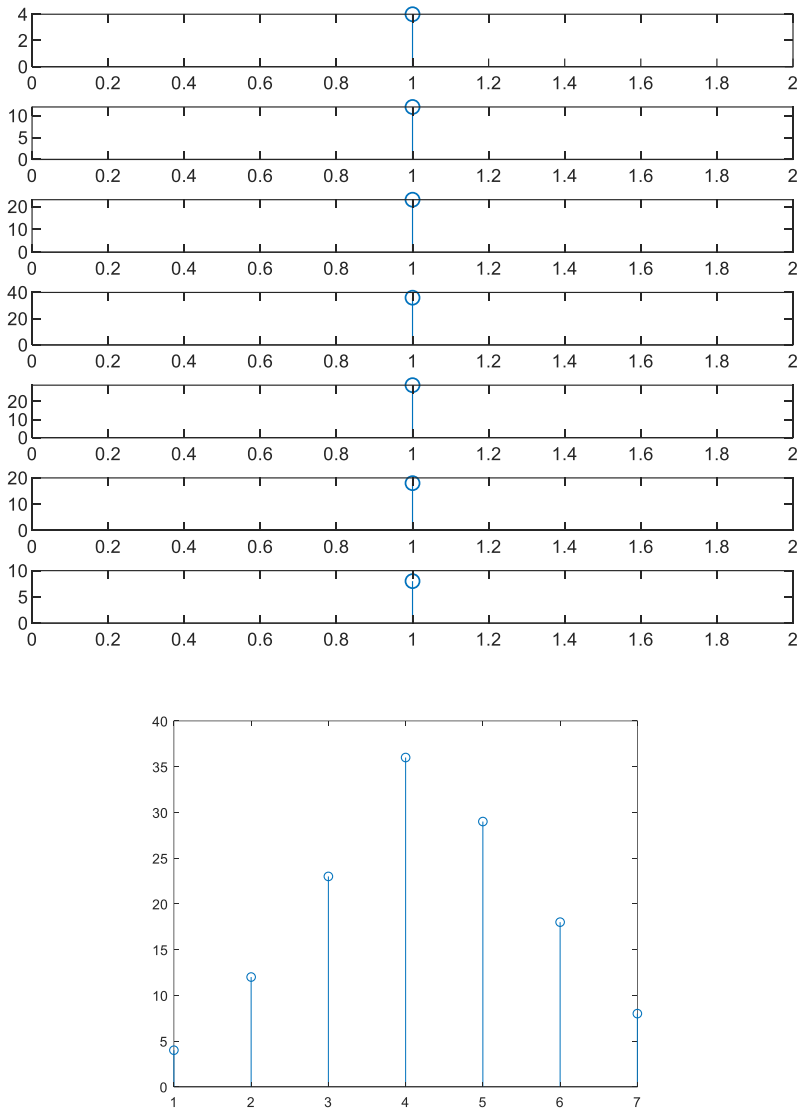


Fig.1.2 Convolution of two signals without the Conv. Function

## 8. Conclusion:

In the experiment, we have plotted different continuous and discrete functions using and without using conv. function. The codes gave correct output graphs which were same as the theoretical explanation and given functions.
Also, the outputs of both the code with and without the use of convolution are same. Thus, we have implemented the convolution method using direct function and also with the logic.

So, we can say, the experiment is done successfully and the desired output is achieved.