

Rajshahi University of Engineering & Technology



Department : Electrical & Computer Engineering

Course No: ECE 4124

Course Name: Digital Signal Processing Sessional

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Experiment No: 1

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Experiment Name:

i. Plotting continuous, discrete, discrete mirror sine wave.

ii. Convolution of two signals using conv function & without using conv function

Theory:

Convolution is a mathematical way of combining two signals to form a third signal. It is the single most important technique in Digital Signal Processing. Using the strategy of impulse decomposition, systems are described by a signal called the impulse response.

Code:

i)

```
clc
clear all
t = -2:0.1:2;
amp=5;
f=0.5;
n=[0 1 2 3 4 5 6 7 8 9]
y=@(t)amp*sin(2*pi*f*t);
subplot(3,1,1)
plot(t,y(t))
title('continuous sine wave')
grid
subplot(3,1,2)
stem(n,y(n))
title('Discrete sine wave')
grid
grid
subplot(3,1,3)
stem(-n,y(n))
title('Discrete mirror sine wave')
grid
```

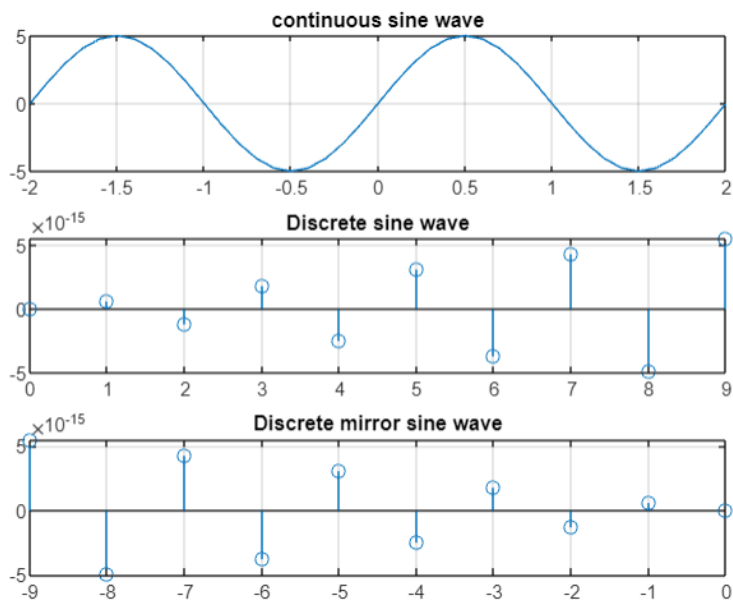


Fig:Continuous,discrete,discrete mirror sine wave

ii)

Convolution using conv function

Code:

```
clc
clear all;
close all;
x = [1 2 3 4];
h = [4 4 3 2];
n=-3:1:3;
N=7;
w=conv(x,h)
```

Output:

```
w =
     4     12     23     36     29     18     8

>>
```

ii) Convolution without using conv function

Code:

```
clc
clear all;
close all;
L=input('input L: ');
M=input('input M: ');

x=input('input matrix x: ');
h=input('input matrix h: ');
lim=L+M-1
y=zeros(1,lim);
for i=1: lim
    for j=1:M
        if i-j+1>0 && i-j+1<= L
            y(i)=y(i)+x(j)*h(i-j+1);
        else
            end
    end
end
y

n1=zeros(1,L);
n2=zeros(1,M);
n3=zeros(1,lim);
for i=1:L
    n1(i)=i;
end
for i=1:M
    n2(i)=i;
end
for i=1:lim
    n3(i)=i;
end
% plot results

subplot(3,1,1)
stem(n1,x(n1))
title('x[n]')
grid

subplot(3,1,2)
stem(n2,h(n2))
title('h[n]')
grid

subplot(3,1,3)
stem(n3,y(n3))
title('y[n]')
grid
```

Output:

```
input L:  
4  
input M:  
4  
input matrix x:  
[1 2 3 4]  
input matrix h:  
[4 4 3 2]
```

```
lim =
```

```
7
```

```
y =
```

```
4    12    23    36    29    18    8
```

```
>>
```

Output figure:

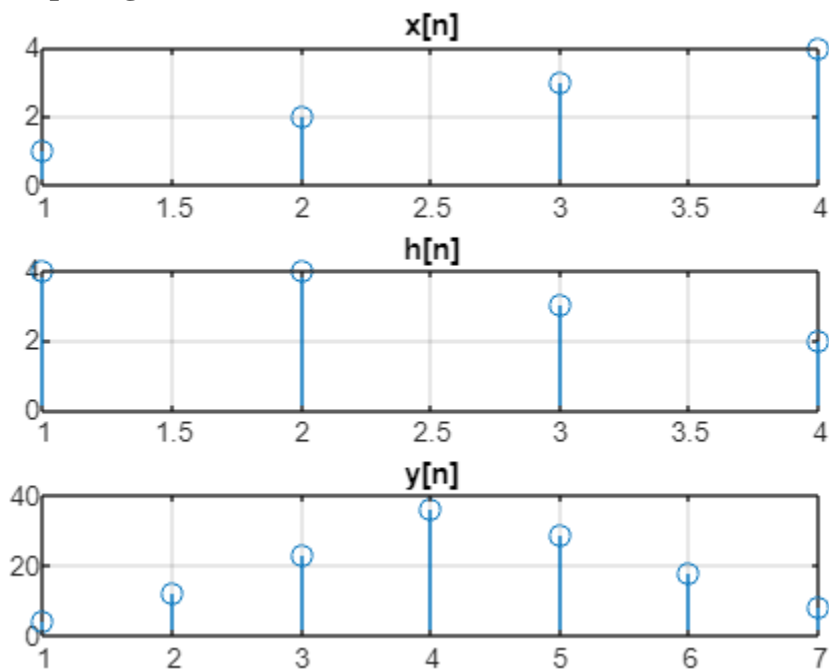


Fig: convolution representation using graphical method

Conclusion:

From the experiment ,the desired result has been achieved.