UNITED INTERNATIONAL UNIVERSITY

Lab Report-(02)

Course Title – Digital Signal Processing Laboratory

Course Code- EEE 3301

Submitted To

Dr. Ahmed, Khawza Iftekhar Uddin
Professor
Department of Electrical and Electronic
EngineeringUnited International University,
Dhaka, Bangladesh

Submitted By

Ayman Zafar	ID: 021 191 058
Nafi Ul Kaysar Buruz	ID: 021 221 101
Ashikur Rahman	ID: 021 191 004
Nafiul Islam	ID: 021 183 004
Sagor Paul	ID: 021 191 070

Objectives:

The goals of this lab session were to learn to solve different equations using filter function, to determine system response using filter function and to convolute, corelate and to learn the practical use of all these applications through implementing them in MATLAB.

Literature Survey:

This session was started through the discussion of Step and Impulse response of a system. Byusing a built-in filter function in MATLAB.

Example 2.8

```
X=input( 'Input the 1st sequence:' );Y=input( 'Input the 2nd sequence:' );Xm=mean(X);
Ym=mean(Y); [R,C]=size(X); N=C; V1=0; V2=0;
for k=1:N
V1=V1+(X(k) - Xm)^2;
V2=V2+(Y(k) - Ym)^2;
end DEN=sqrt(V1*V2);NUM=0;
for k=1:N
NUM=NUM+(X(k)- Xm)*(Y(k) - Ym);
end
disp( 'The correlation coefficient is:' )disp(NUM/DEN)
```

Figure(a):

```
>> Untitled
Input the 1st sequence:[1,2,3]
Input the 2nd sequence:[1,2,3]
The correlation coefficient is:
     1
```

Figure(b):

```
>> Untitled
Input the 1st sequence:[1,2,3]
Input the 2nd sequence:[-1,-2,-3]
The correlation coefficient is:
    -1
```

Figure(c):

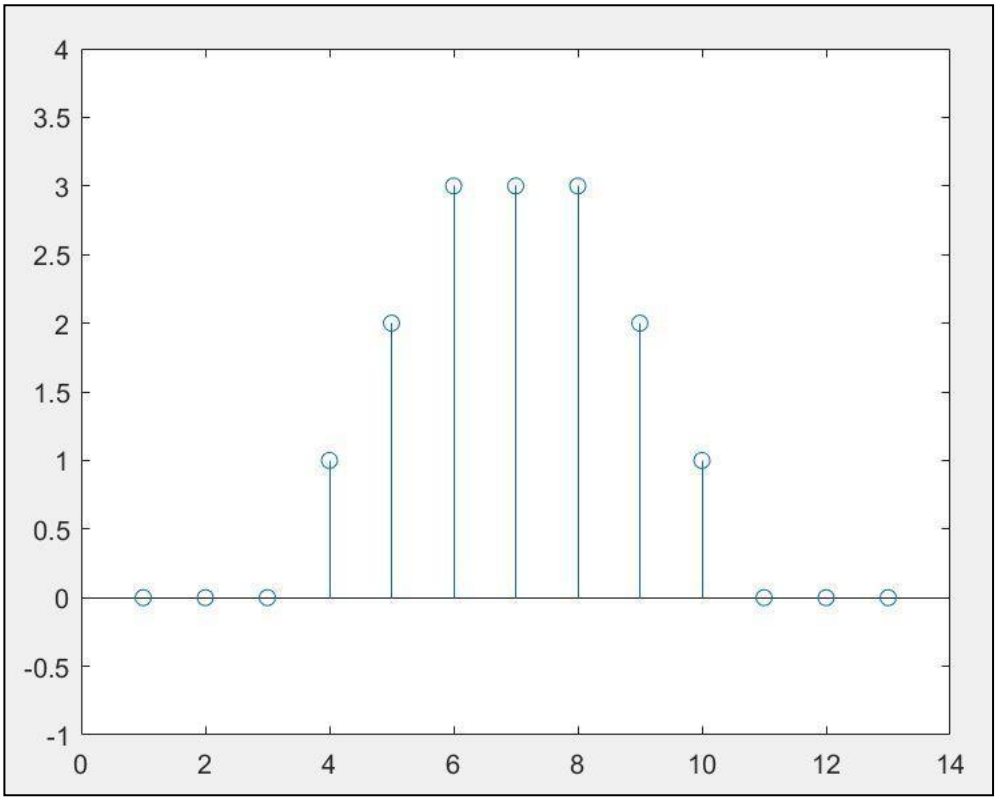
```
>> Untitled
Input the 1st sequence:[1,2,3]
Input the 2nd sequence:[3,2,1]
The correlation coefficient is:
    -1
```

Home Works

HW 1:

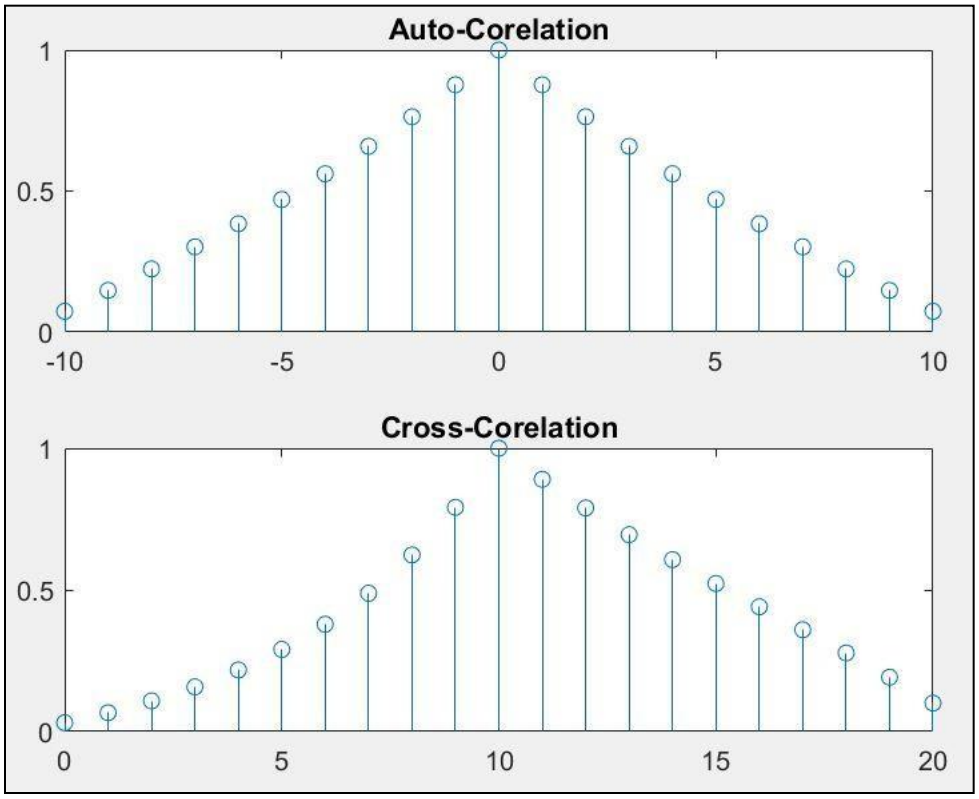
```
x1=[0, 0, 1, 1, 1, 1, 1]; nx1=[-3:3];
x2=[0, 0, 0, 1, 1, 1]; nx2=[-3:2];
y=xcorr(x1,x2);stem(y);
axis([0 14 -1 4]);
```

Figure:



HW 2:

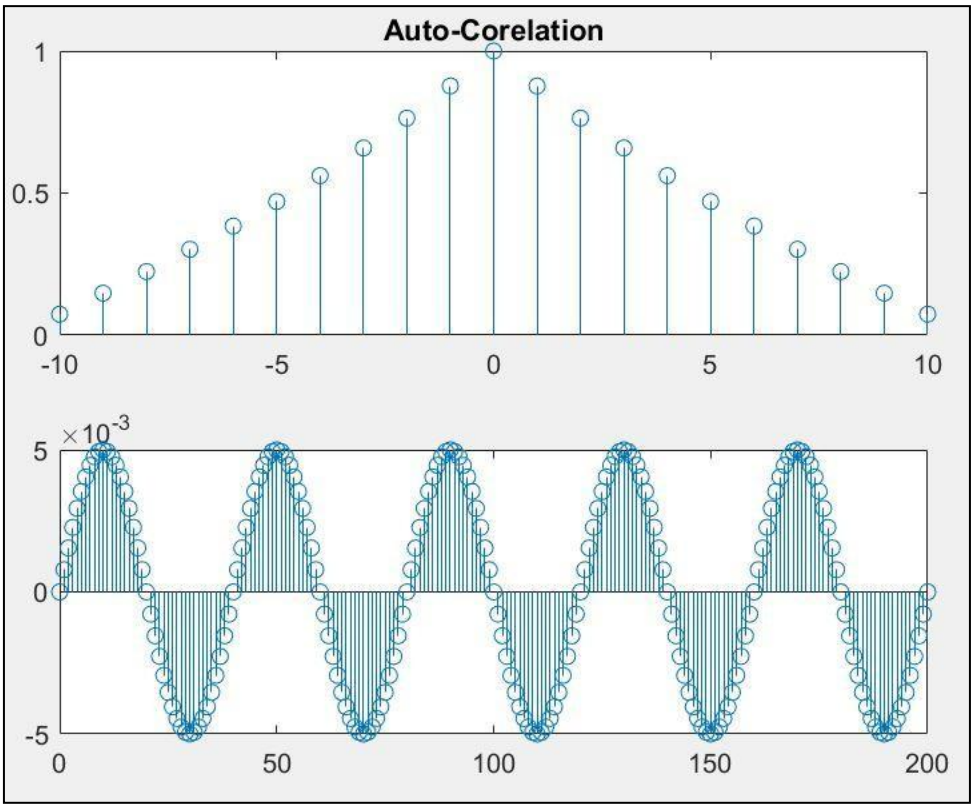
```
n1 = (0:10);
n2 = (-10:0);x1 = 0.9.^n1;y1 = 0.8.^n2;
[y,ny] = sigshift(x1,n1,0);
[x,nx] = sigfold(x1,n1);
[rxy,nxy] = conv_m(x,nx,y,ny);subplot(2,1,1); stem(nxy,rxy/max(rxy)); title('Auto-Corelation')
[y,ny] = sigshift(x1,n1,0);
[x,nx] = sigfold(y1,n2);
[rxy,nxy] = conv_m(x,nx,y,ny);
subplot(2,1,2); stem(nxy,rxy/max(rxy)); title('Cross-Corelation')
```



HW 3:
a)

```
a=[1]; b=[1/200];n=[0:200];
x=sin((pi/20).*n);
h=filter(b,a,x);stem(n,h)
```

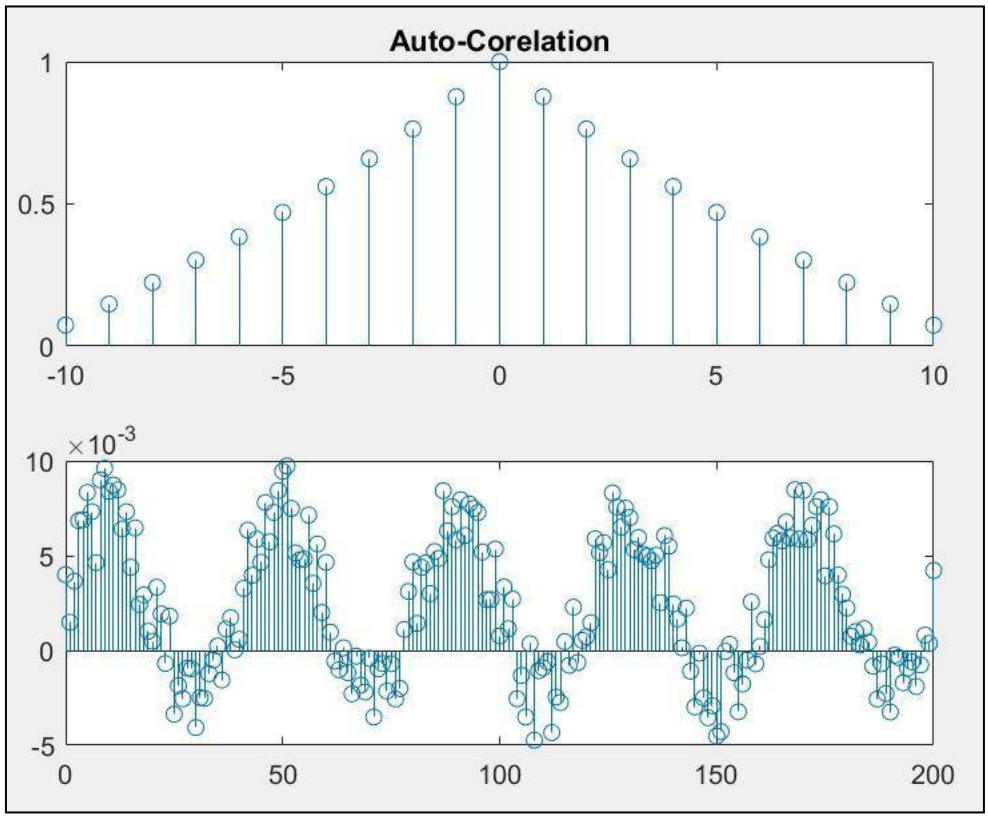
Figure:



b)

```
a=[1]; b=[1/200];n=[0:200];
i=sin((pi/20).*n); m=rand(1,length(n));x=i+m; h=filter(b,a,x);
stem(n,h);
```

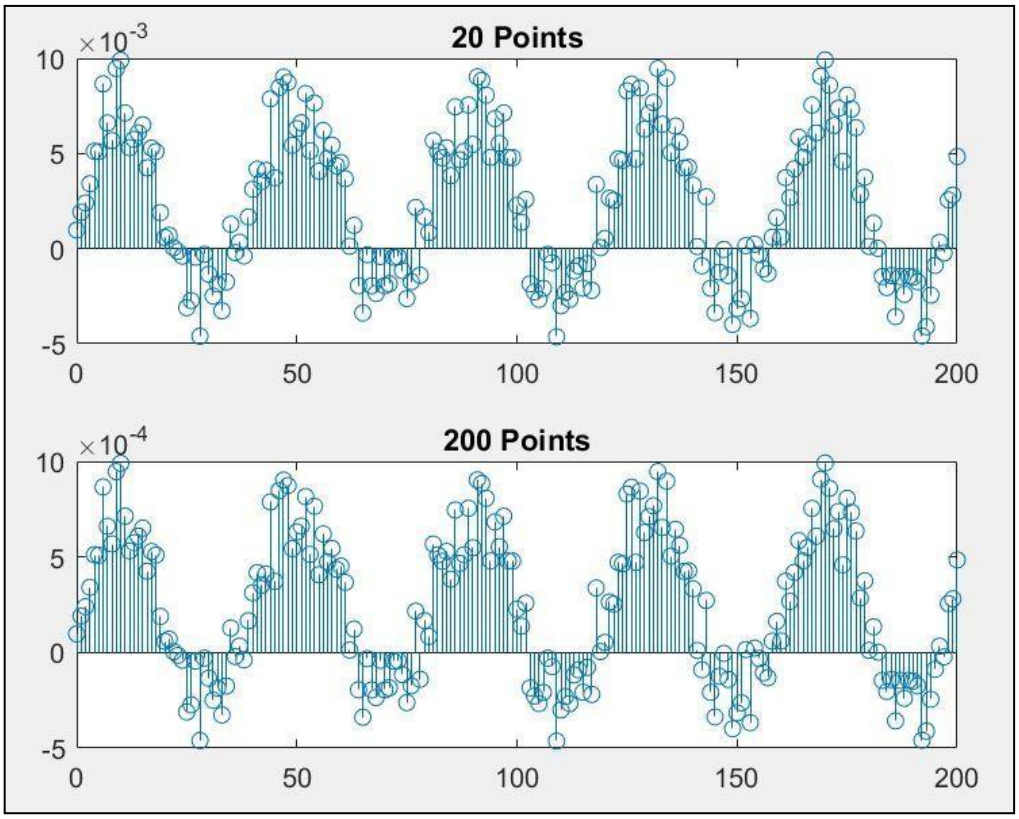
Figure:



c)

```
a=[1]; b=[1/200]; c=[1/2000];n=[0:200];
i=sin((pi/20).*n); m=rand(1,length(n));x=i+m; p1=filter(b,a,x); subplot(2,1,1);
stem(n,p1); title('20 Points');p2=filter(c,a,x); subplot(2,1,2);
stem(n,p2); title('200 Points')
```

Figure:



Conclusion:

To conclude everything, in this session our instructor focused more on how to relate these applicationson practical perspective so students can visualize a practical world out of this idea.