P/C 14/11/21

University of Rajshahi

Department of Information and Communication Engineering

B.Sc. (Engg.) Part-3 **(Odd** Semester) Examinatioin-**2014**

Course Code: **ICE-3112**

Course Title : Laboratory-**(b) Digital Signal Processing**

Student's Name :	SHAFAT – AL – NOMAN

Roll No.:	1208609	**Group No.:**	

Expt. No.:	
Title of Experiment :	sinwave signal, addition and Multiplication, Even and odd, Hamming window, Hanning window, load plain, FFT to IFFT

Date of Issue :	
Date of completion:	
Date of Submission :	28-09-14

Signature of the Lab Teacher

EXPERIMENT NO:01

NAME OF THE EXPERIMENT:

Write a program that generate 64 samples of a sinusoidal signal of frequency 1KHz with a sampling frequency 8KHz:

PROGRAM:

```
closeall;
clearall;
clc;
A=input('Amplitude= ');
Theta=input('Theta= ');
Theta=(pi*Theta/180);
n=0:63;
s=A*sin(2*pi*(1/8)*n+Theta);
plot(n,s);
title('sinewave');
xlabel('Time');
ylabel('Amplitude');
```

OUTPUT:

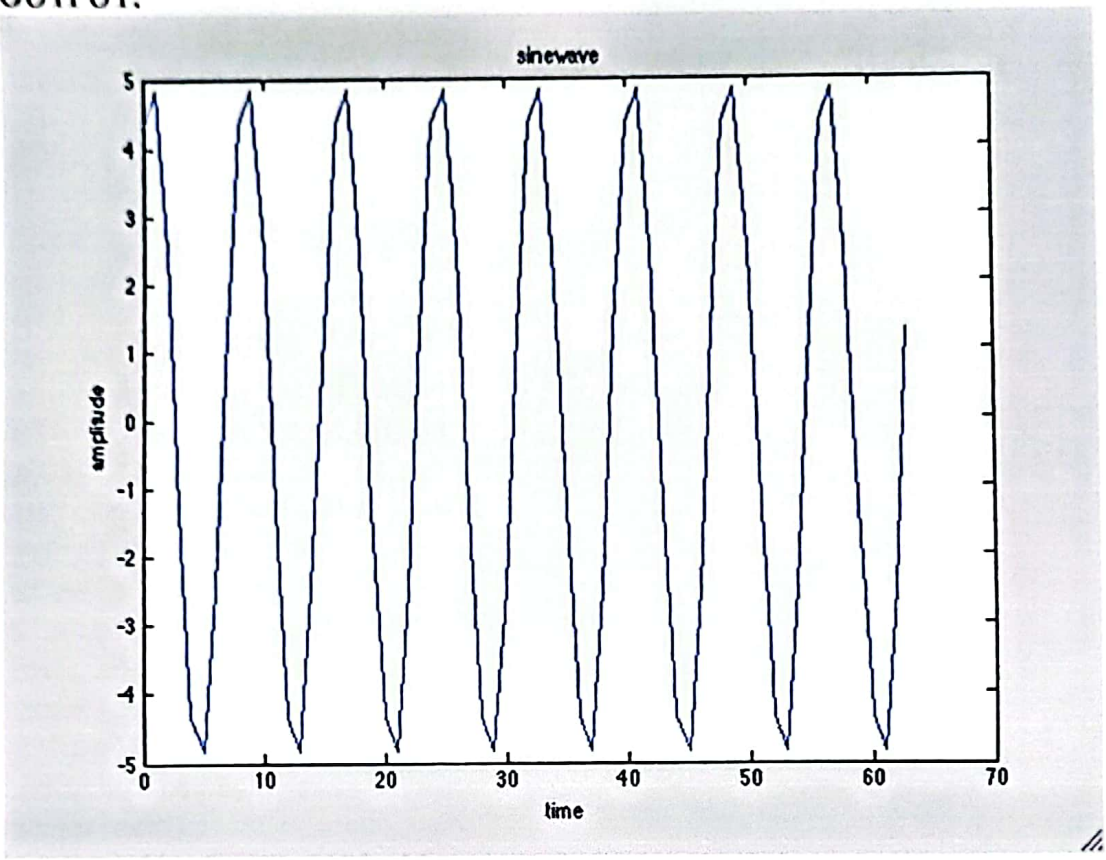

Fig. 1: Sin wave

EXPERIMENT NO:02

NAME OF THE EXPERIMENT:
Write a program that add and multiply two sinusoidal signal:

PROGRAM:

```
clearall;
closeall;
clc;
n=-50:50;
s1=(20*sin(n*pi/180));
s2=(40*sin(n*pi/180));
add=(s1+s2);
multiply=(s1.*s2);
subplot(4,1,1);
stem(s1);
xlabel('sinusoidal signal');
subplot(4,1,2);
stem(s2);
xlabel('sinusoidal signal');
subplot(4,1,3);
stem(add);
xlabel('Addition');
subplot(4,1,4);
stem(multiply);
xlabel('Multplication');
```

OUTPUT:

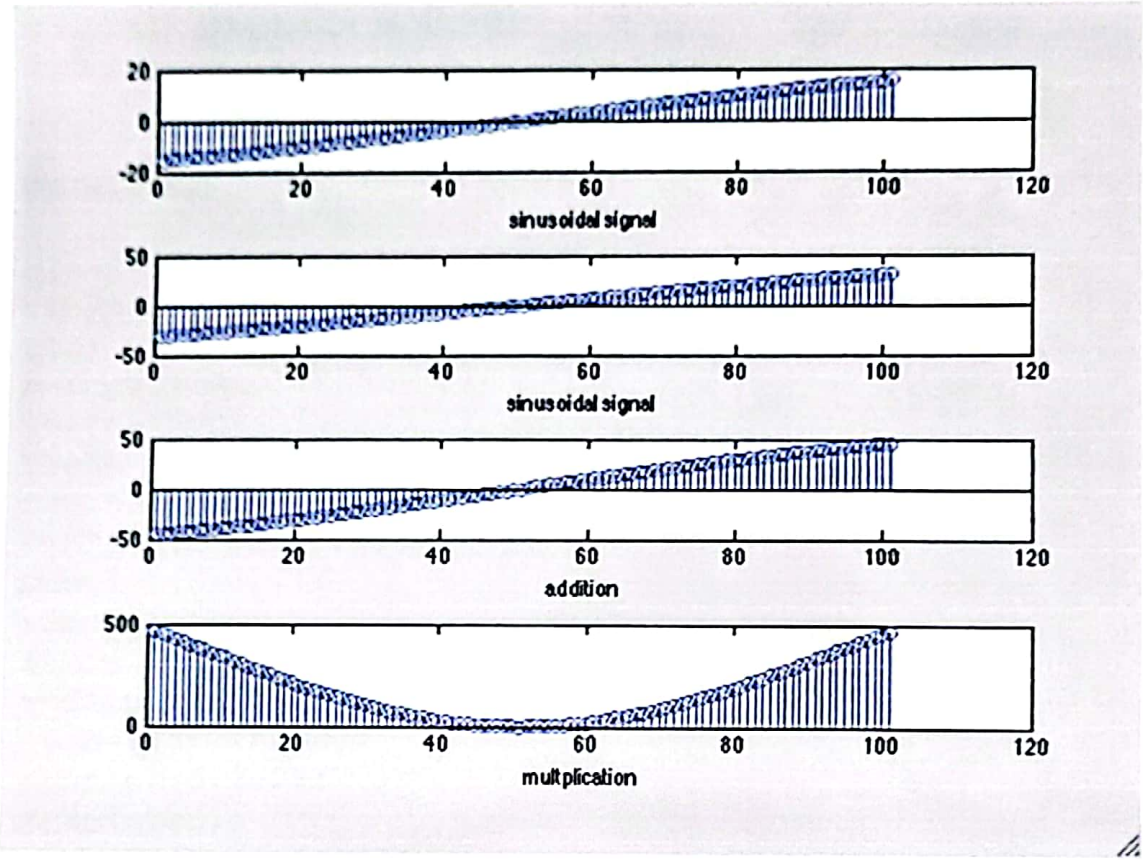

Fig. 2: Addition And Multiplication

EXPERIMENT NO:03

NAME OF THE EXPERIMENT:
Write a program thatfind odd and even part of a signal:

PROGRAM:

```
clearall;
closeall;
clc;
A=input('Amplitude=');
Theta=input('Theta=');
Theta=(pi*Theta/180);
n=0:63;
s=A*sin(2*pi*(1/8)*n+Theta);
subplot(3,1,1);
stem(s);
xlabel('signal');
y=fliplr(s);
even=((s+y)*0.5);
subplot(3,1,2);
stem(even);
xlabel('Evenpart');
odd=((s-y)*.5);
subplot(3,1,3);
stem(odd);
xlabel('oddpart');
```

OUTPUT:

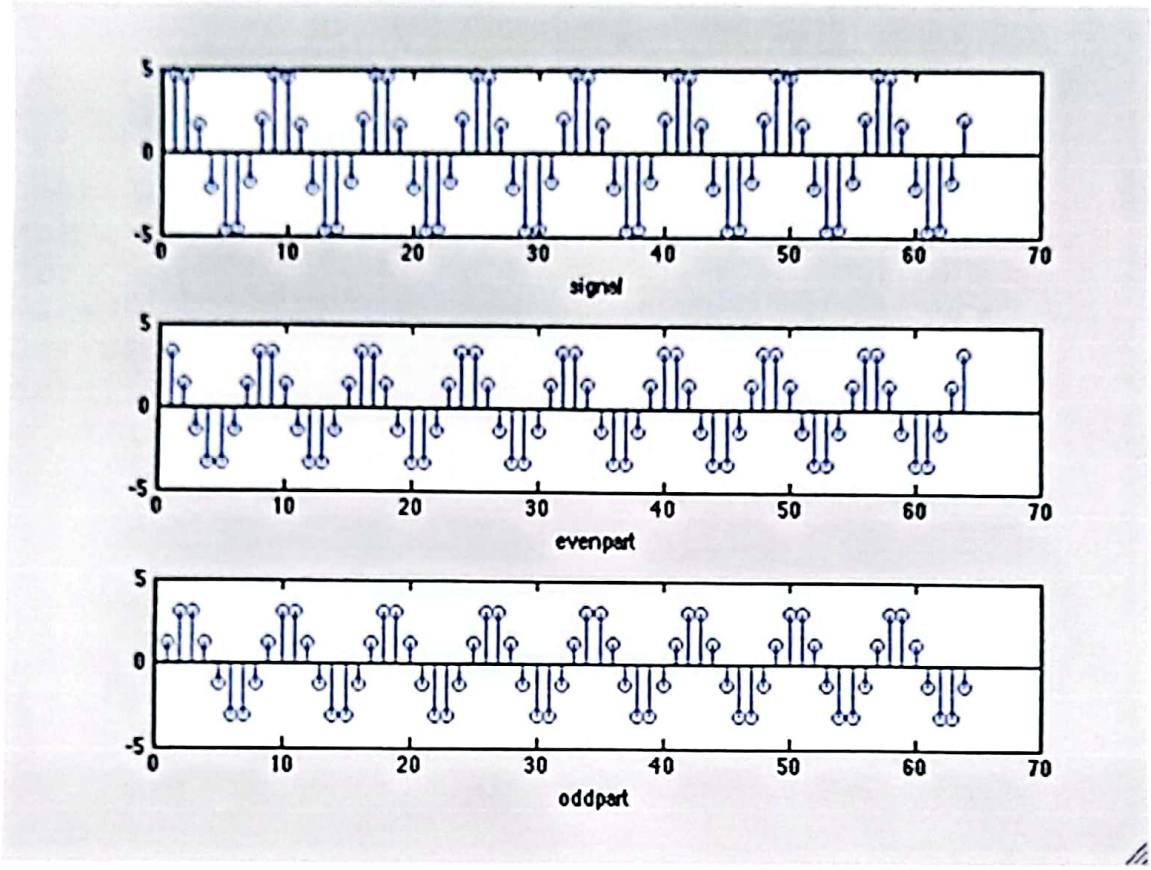

Fig. 3: Even and Odd

EXPERIMENT NO:04

NAME OF THE EXPERIMENT:
Write a program that load a given signal "plain" from a directory:

PROGRAM:

```
clearall;
closeall;
clc;
x=load('plain');
plot(x);
xlabel('plain signal');
```

OUTPUT:

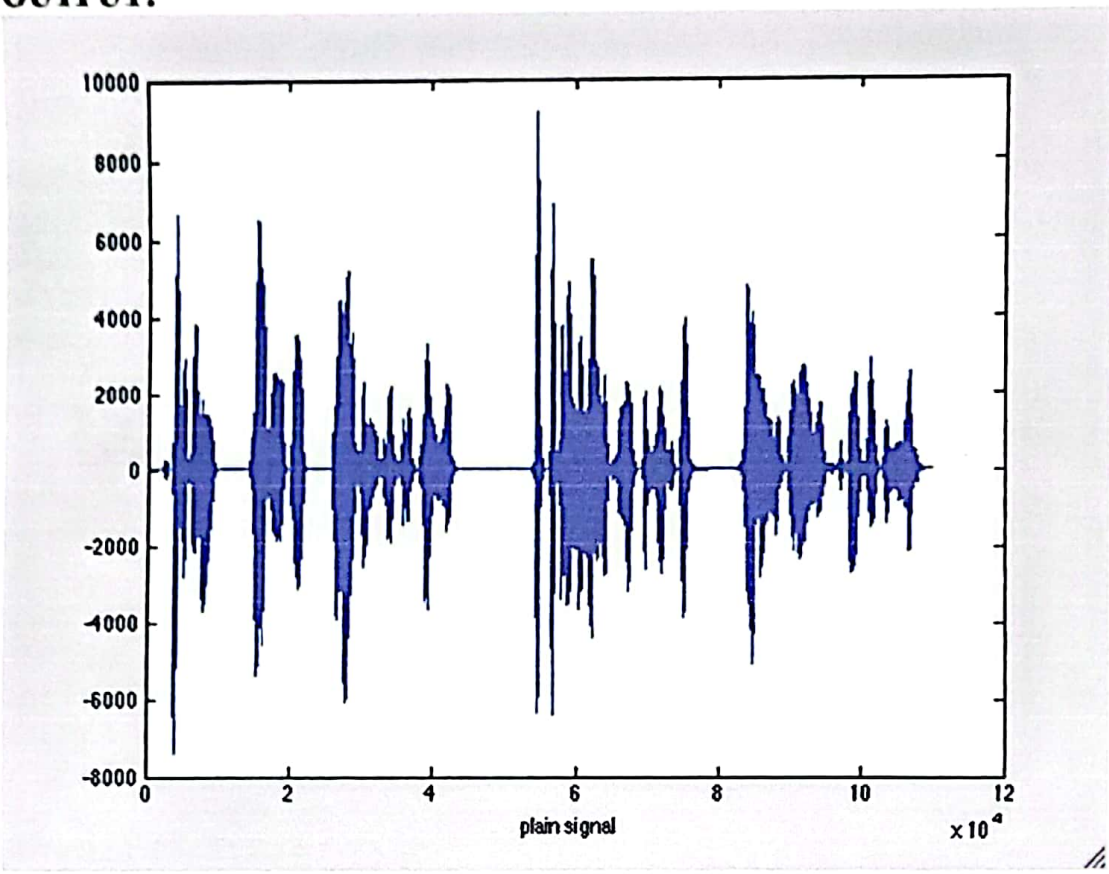

Fig. 4: A Signal (Plain)

Experiment No : 05
Name of Experiment : Segment the plain data and showed it in a hamming window.

Program :

```
load('plain');
s=plain;
l=512;
segment=s(12001:12000+l);

for i=1:l;
    hamming_window(i)=0.54-0.46*cos(2*pi*(i-1)/(l-1));
end;
segment_w=segment.*hamming_window';

subplot(3,1,1);
plot(s);
title('voice signal');
xlabel('time');
ylabel('amplitude');

subplot(3,1,2);
plot(segment);
title('segment signal');
xlabel('time');
ylabel('amplitude');

subplot(3,1,3);
plot(segment_w);
title(' segment_w signal');
xlabel('time');
ylabel('amplitude');
```

Output :

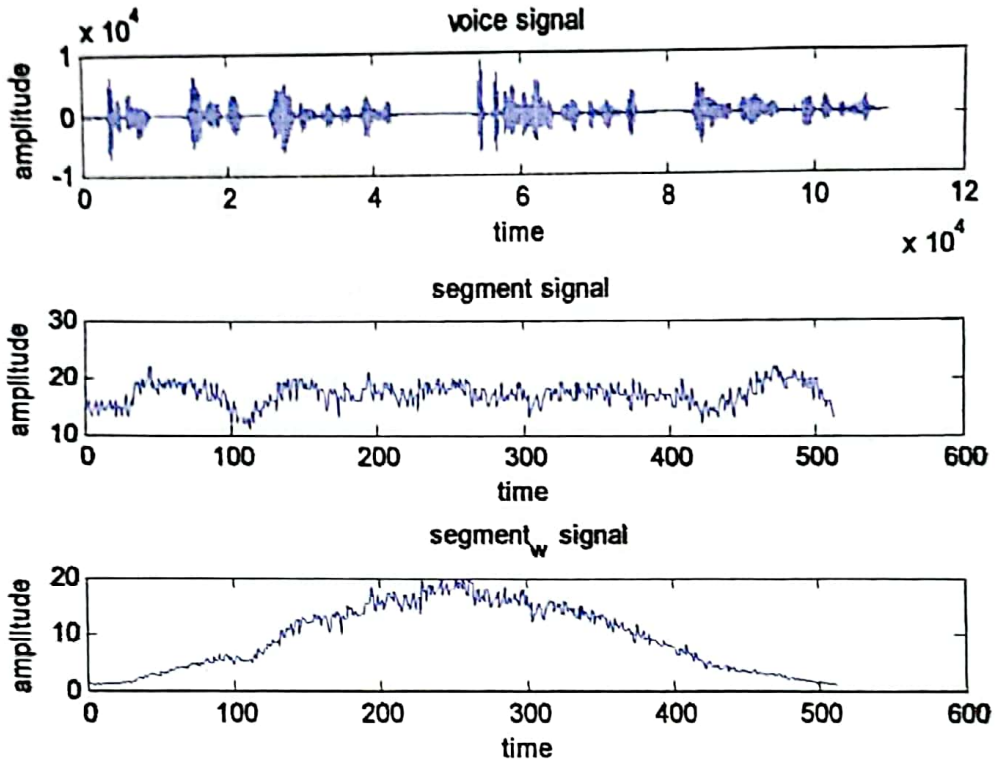

Fig. 5: Hamming Window

Experiment No : 06

Name of Experiment : Segment the plain data and showed it in a hanning window.

Program :

```
load('plain');
s=plain;
l=512;
segment=s(12001:12000+1);

for i=1:l;
    hanning_window(i)=0.5*(1-cos((2*pi*i)/(l-1)));
end;
segment_w=segment.*hanning_window';

subplot(3,1,1);
plot(s);
title('voice signal');
xlabel('time');
ylabel('amplitude');

subplot(3,1,2);
plot(segment);
title('segment signal');
xlabel('time');
ylabel('amplitude');

subplot(3,1,3);
plot(segment_w);
title(' segment_w signal');
xlabel('time');
ylabel('amplitude');
```

Output :

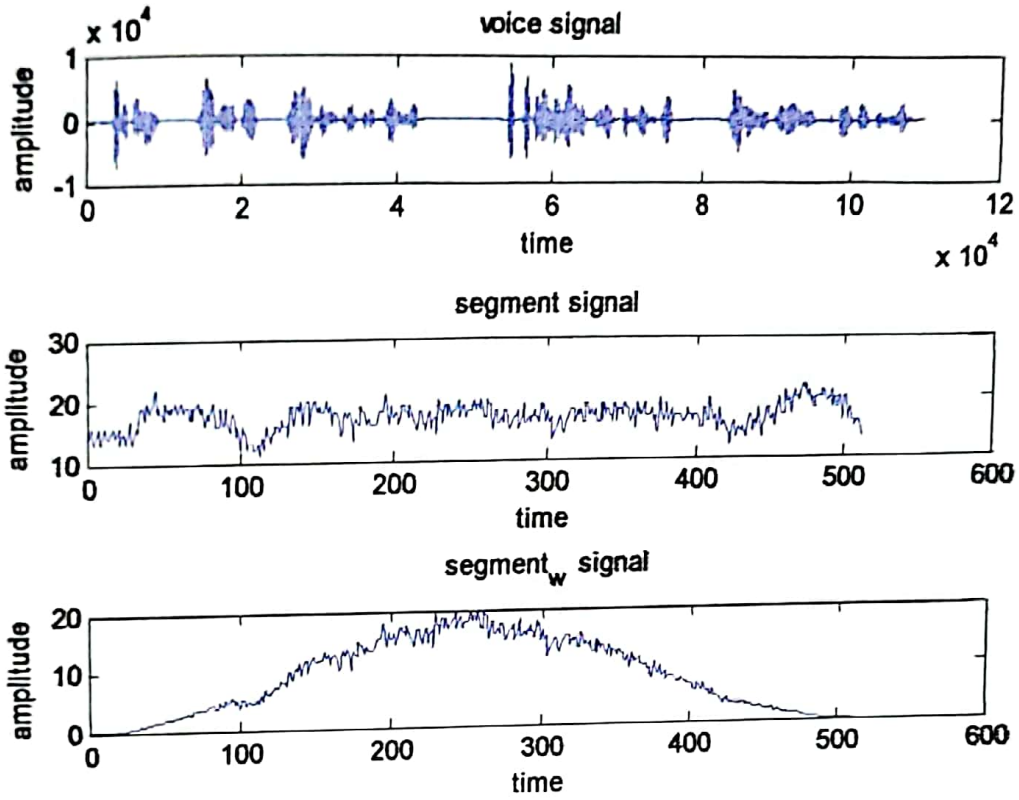

Fig. 6: Hanning Window

EXPERIMENT NO:07

NAME OF THE EXPERIMENT:

Write a program thatshowFFT to IFFT:

PROGRAM:

```
clearall;
closeall;
clc;
load('plain');
s=plain;
l=512;
n=1024;
segment=s(17001:17000+1);
x=(abs(fft(segment,n).^2));
y=real(ifft(x));
subplot(2,1,1)
plot(x);
xlabel('fft signal');
subplot(2,1,2);
plot(y);
xlabel('ifft signal');
```

FFT Point

OUTPUT:

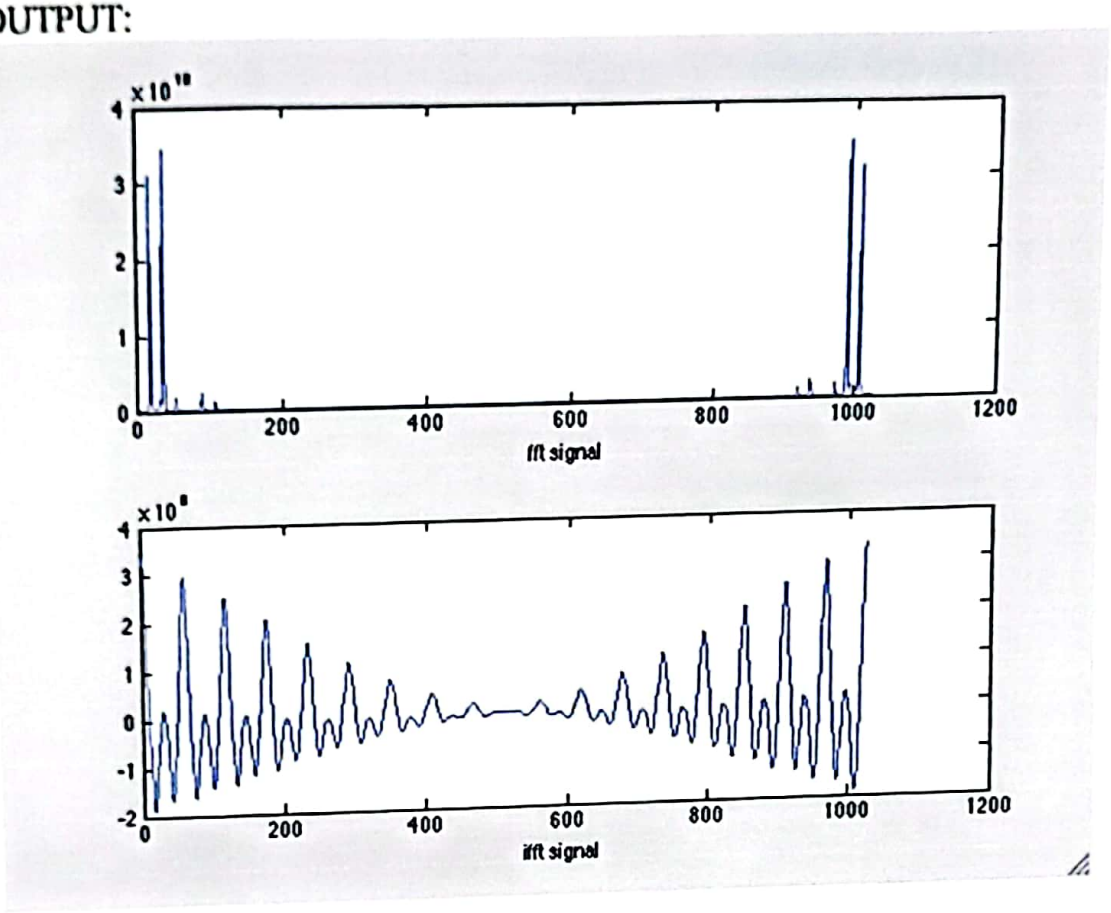

Fig. 7: FFT to IFFT