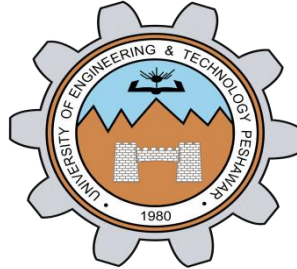


Lab Report No 4



Digital Signal processing

Submitted By: Muhammad Ali

Registration No: 19pwcse1801

Section: A

“On my honor , as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this

Department of Computer Systems Engineering
University of Engineering and Technology Peshawar

CSE 402L: Digital Signal Processing

Accuracy	The student completed (<50%) tasks and provided MATLAB code and/or Simulink models with errors. Outputs shown are not correct in form of graphs (no labels) and/or tables along with incorrect analysis or remarks.	The student completed partial tasks (50% - <90%) with accurate MATLAB code and/or Simulink models. Correct outputs are shown in form of graphs (without labels) and/or tables along with correct analysis or remarks.	The student completed all required tasks (90%-100%) with accurate MATLAB code and/or Simulink models. Correct outputs are shown in form of labeled graphs and/or tables along with correct analysis or remarks.	30%
Following Directions	The student clearly failed to follow the verbal and written instructions to successfully complete the lab	The student failed to follow the some of the verbal and written instructions to successfully complete all requirements of the lab	The student followed the verbal and written instructions to successfully complete requirements of the lab	20%
Time Utilization	The student failed to complete even part of the lab in the allotted amount of time	The student failed to complete the entire lab in the allotted amount of time	The student completed the lab in its entirety in the allotted amount of time	20%

Demonstration of Concepts	Poor (Does not meet expectation (1)) The student failed to demonstrate a clear understanding of the assignment concepts	Fair (Meet Expectation (2-3)) The student demonstrated a clear understanding of some of the assignment concepts	Good (Exceeds Expectation (4-5)) The student demonstrated a clear understanding of the assignment concepts	Score 30%
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Tasks no 1-4: -

```
% code for sinusiod of frequency 10,30,50 and its fourier transform

t=0:1/1000:1;
A=1;
signal1 = A*sin(2*pi*10*t);
subplot(311);
plot(t,signal1);
title('sinusiod of frequency 10Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

signal2 = A*sin(2*pi*30*t);
subplot(312);
plot(t,signal2);
title('sinusiod of frequency 20Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

signal3 = A*sin(2*pi*50*t);
subplot(313);
plot(t,signal3);
title('sinusiod of frequency 50Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

% fourier transform of above signals having frequency 10,30,50
figure;
fouriertransform=fft(signal2,length(signal1));
n=length(fouriertransform);
ftshift=(-n/2:n/2-1)*(1000/n);
signalshift=(fftshift(fouriertransform));
absvalue=abs(signalshift);
subplot(311);
plot(ftshift,absvalue);
title('sinusiod of frequency 10Hz in frequency-domain');
xlabel('frequency');
ylabel('Amplitude');

fouriertransform=fft(signal2,length(signal2));
n=length(fouriertransform);
ftshift=(-n/2:n/2-1)*(1000/n);
signalshift=(fftshift(fouriertransform));
absvalue=abs(signalshift);
subplot(312);
plot(ftshift,absvalue);
title('sinusiod of frequency 30Hz in frequency-domain');
xlabel('frequency');
ylabel('Amplitude');

fouriertransform=fft(signal3,length(signal3));
n=length(fouriertransform);
```

```

        signalshift=(fftshift(fouriertransform));
        ftshift=(-n/2:n/2-1)*(1000/n);
        signalshift=(fftshift(fouriertransform));
        absvalue=abs(signalshift);
        subplot(313);
        plot(ftshift,absvalue);
        title('sinusiod of frequency 50Hz in frequency-domain');
        xlabel('frequency');
        ylabel('Amplitude');

    % code for sinusiods of frequency 20,40,60 and its fourier transform
    figure;
    t=0:1/1000:1;
    A=1;
    signal1 = A*sin(2*pi*20*t);
    subplot(311);
    plot(t,signal1);
    title('sinusiod of frequency 20Hz in time-domain');
    xlabel('time');
    ylabel('Amplitude');

    signal2 = A*sin(2*pi*40*t);
    subplot(312);
    plot(t,signal2);
    title('sinusiod of frequency 40Hz in time-domain');
    xlabel('time');
    ylabel('Amplitude');

    signal3 = A*sin(2*pi*60*t);
    subplot(313);
    plot(t,signal3);
    title('sinusiod of frequency 60Hz in time-domain');
    xlabel('time');
    ylabel('Amplitude');

    % fourier transform of above signals having frequency 20,40,60
    figure;
    fouriertransform=fft(signal2,length(signal1));
    n=length(signal1);
        ftshift=(-n/2:n/2-1)*(1000/n);
        signalshift=(fftshift(fouriertransform));
        absvalue=abs(signalshift);
        subplot(311);
        plot(ftshift,absvalue);
        title('sinusiod of frequency 20Hz in frequency-domain');
        xlabel('frequency');
        ylabel('Amplitude');

    fouriertransform=fft(signal2,length(signal2));
    n=length(signal2);
        ftshift=(-n/2:n/2-1)*(1000/n);
        signalshift=(fftshift(fouriertransform));
        absvalue=abs(signalshift);
        subplot(312);
        plot(ftshift,absvalue);
        title('sinusiod of frequency 40Hz in frequency-domain');

```

```

xlabel('frequency');
ylabel('Amplitude');

fouriertransform=fft(signal3,length(signal3));
n=length(signal3);
    ftshift=(-n/2:n/2-1)*(1000/n);
signalshift=(fftshift(fouriertransform));
absvalue=abs(signalshift);
subplot(313);
plot(ftshift,absvalue);
title('sinusiod of frequency 60Hz in frequency-domain');
xlabel('frequency');
ylabel('Amplitude');

```

Plot: -

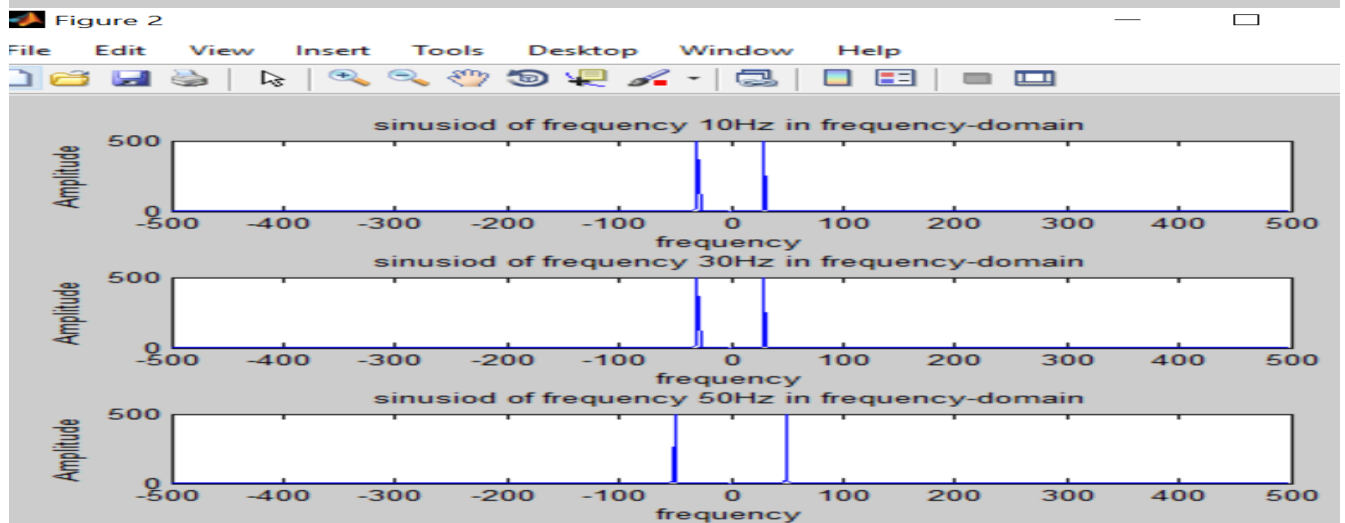
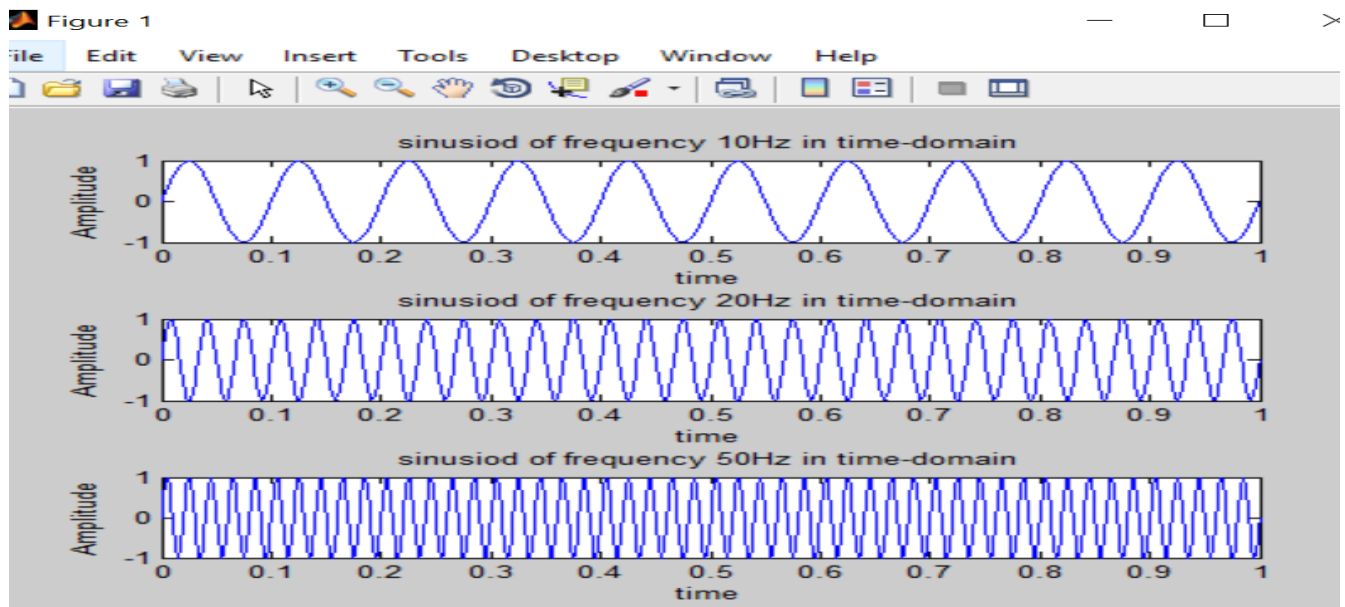


Figure 3

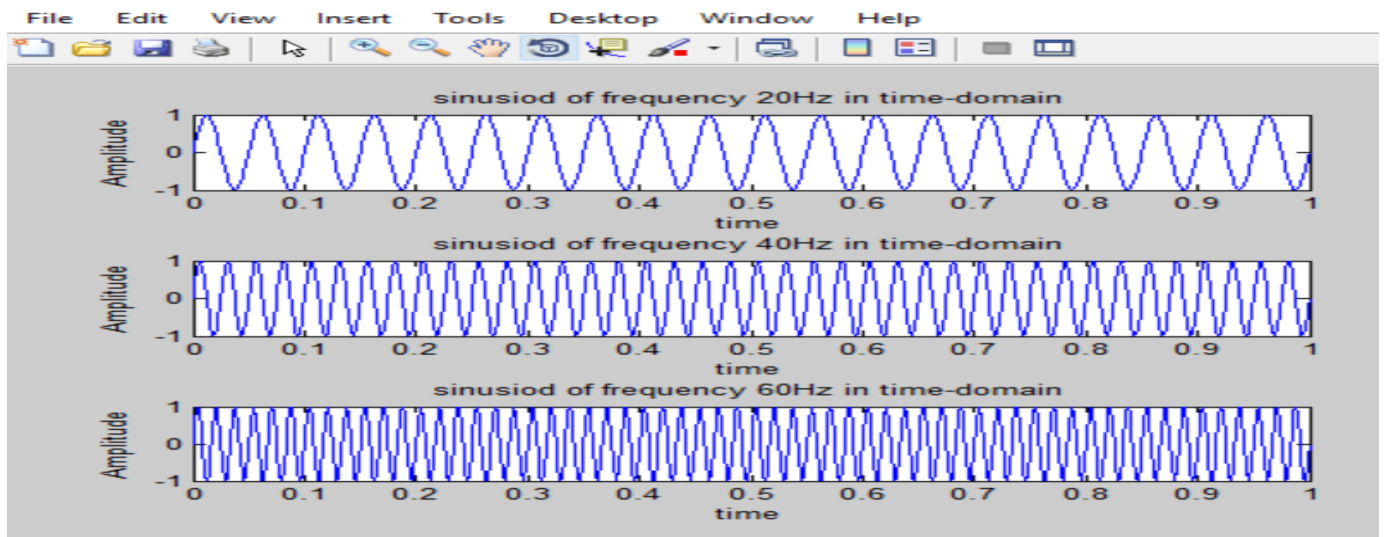
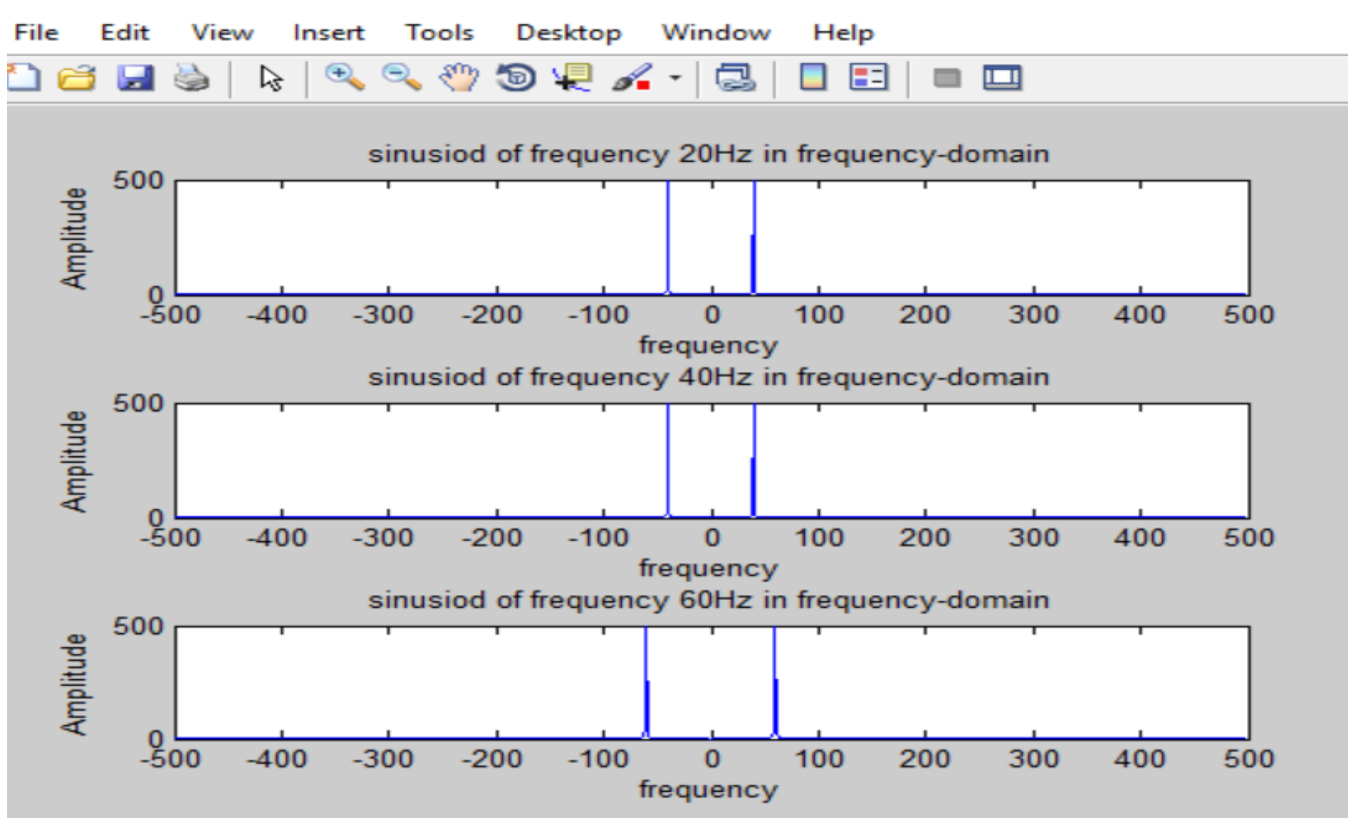


Figure 4



Task no 4-8: -

```
% code for sinusiod of frequency 10,30,50 and its fourier transform

t=0:1/1000:1;
A=1;
signal1 = A*sin(2*pi*10*t);
subplot(311);
plot(t,signal1);
title('sinusiod of frequency 10Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

signal2 = A*sin(2*pi*30*t);
subplot(312);
plot(t,signal2);
title('sinusiod of frequency 20Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

signal3 = A*sin(2*pi*50*t);
subplot(313);
plot(t,signal3);
title('sinusiod of frequency 50Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

compositel=signal1+signal2+signal3;

%step no 3,4: code for sinusiods of frequency 20,40,60 and its fourier
transform
figure;
t=0:1/1000:1;
A=1;
signal1 = A*sin(2*pi*20*t);
subplot(311);
plot(t,signal1);
title('sinusiod of frequency 20Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

signal2 = A*sin(2*pi*40*t);
subplot(312);
plot(t,signal2);
title('sinusiod of frequency 40Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

signal3 = A*sin(2*pi*60*t);
subplot(313);
```

```

plot(t,signal3);
title('sinusiod of frequency 60Hz in time-domain');
xlabel('time');
ylabel('Amplitude');

composite2=signal1+signal2+signal3;

figure;
subplot(211);
composite=composite1+composite2;
plot(t,composite);
title('composite signal in time-domain');
xlabel('time');
ylabel('Amplitude');

%fourier transform of composite signal
subplot(212);
ft= fft(composite,length(composite));
signalshift=(fftshift(ft));
n=length(composite);
ftshift=(-n/2:n/2-1)*(1000/n);
abvalue=abs(signalshift);
plot(ftshift,abvalue);

%step no 5: plot comfirm that all factor included in the plot

%step no 6: generating noise signal
figure;
noise1=0.5*sin(2*pi*80*t);
noise2=0.7*sin(2*pi*100*t);
noise= noise1 + noise2;
subplot(211);
plot(t,noise);
title('noise in time-domain');
xlabel('time');
ylabel('Amplitude');

% fourier transform of noise
fof_n=fft(noise,length(noise));
signalshift=(fftshift(fof_n));
n=length(noise);
ftshift=(-n/2:n/2-1)*(1000/n);
abv=abs(signalshift);
subplot(212);
plot(ftshift,abv);
title('noise in frequency-domain');
xlabel('time');
ylabel('Amplitude');

%step no 7: add noise to composite signal
figure;
subplot(211);
sum=noise+composite;
plot(t,sum);
title('noise+ composite in time-domain');

```



```

xlabel('time');
ylabel('Amplitude');

% fourier transform of noise +composite signal
subplot(212);
fof_noiesandcomposite=fft(sum,length(sum));
signalshift=(fftshift(fof_noiesandcomposite));
n=length(sum);
ftshift=(-n/2:n/2-1)*(1000/n);
abvalue=abs(signalshift);
subplot(212);
plot(ftshift,abvalue);
title('noise + composite in frequency-domain');
xlabel('time');
ylabel('Amplitude');

```

plot: -

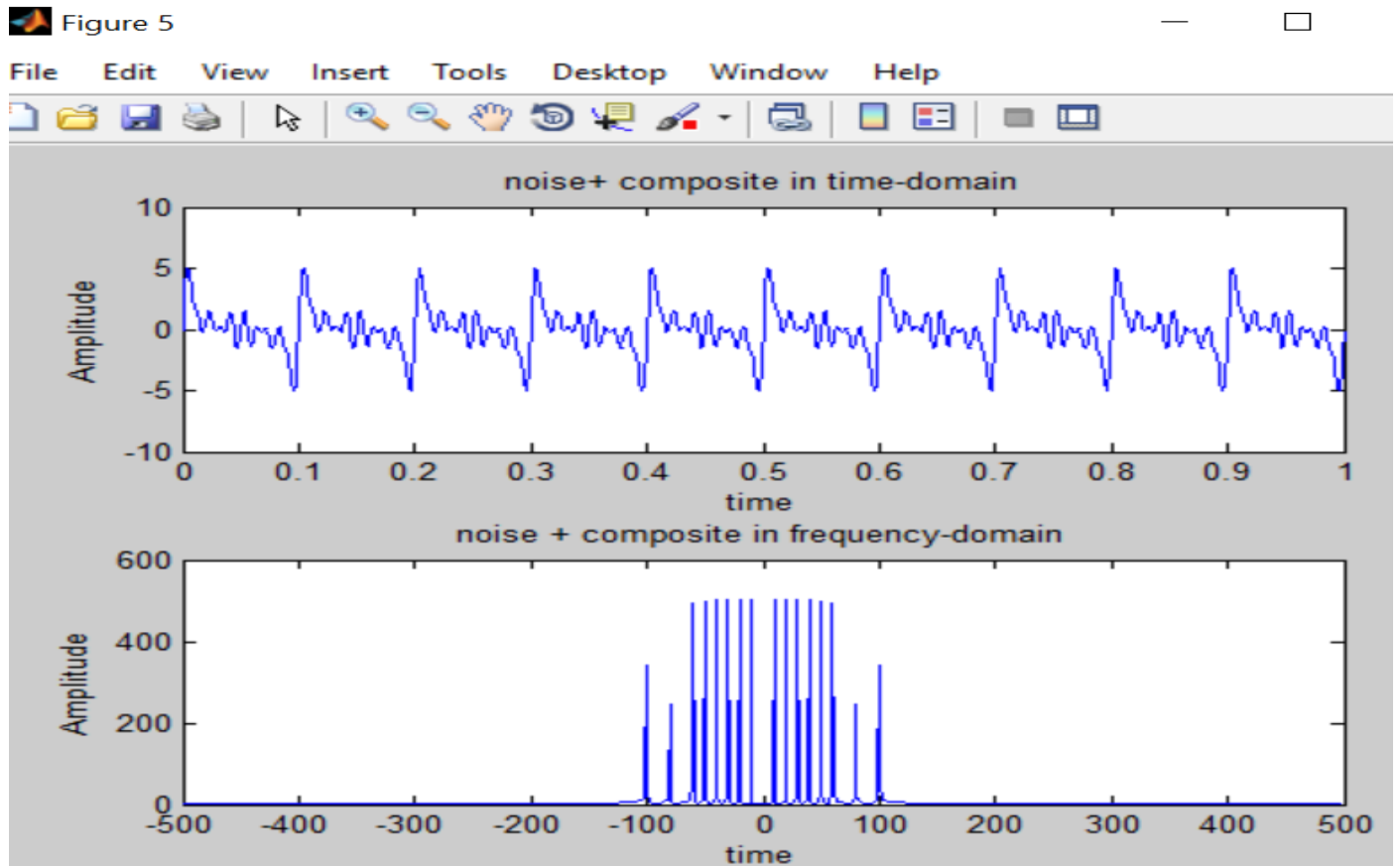


Figure 3

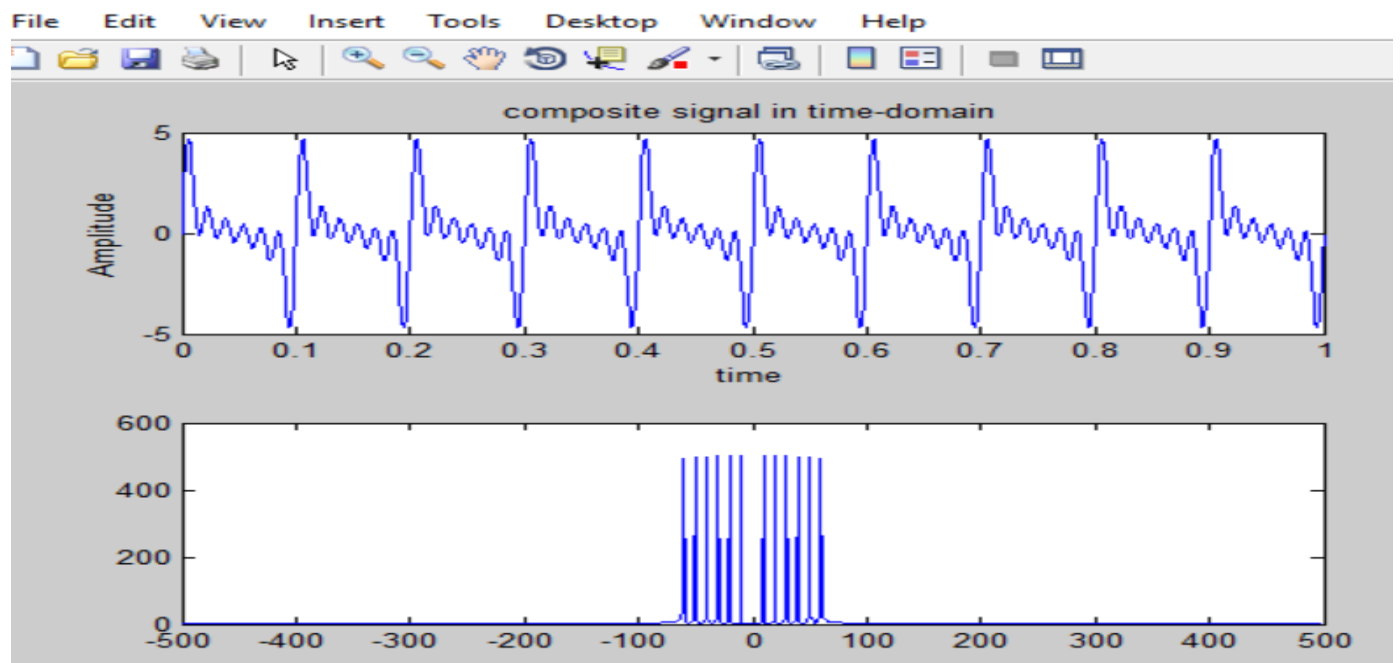


Figure 4

