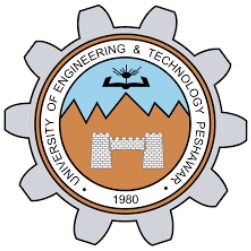
Digital Signal Processing Lab

Lab Report # 04



Submitted By: AWAIS SADDIQUI

Registration No: 21PWCSE1993

Section: "A"

"On my honor, as student at University of Engineering and Technology, I have neither given nor received unauthorized. assistance on this academic work"

Student Signature: _____

Submitted to:

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CSE 309L: Communication Systems

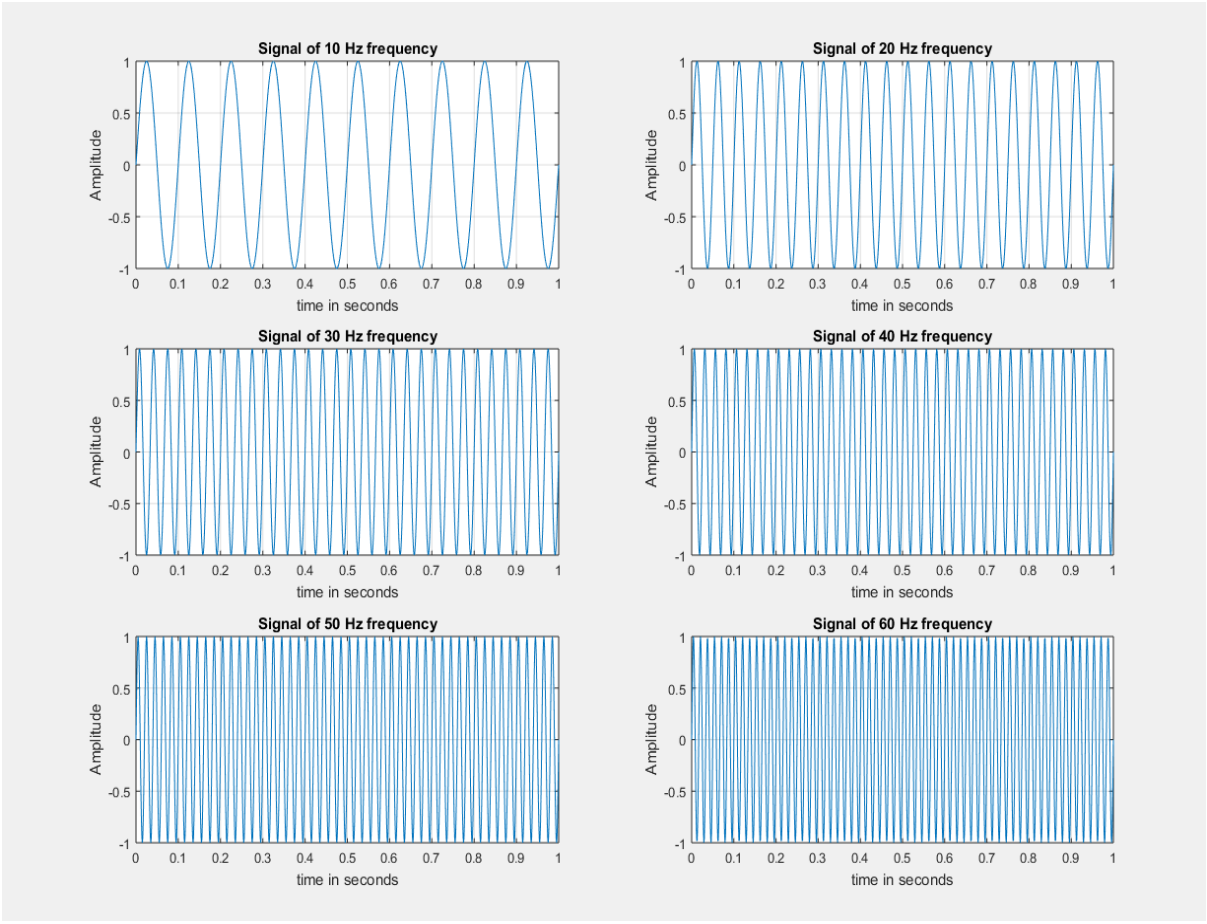
Demonstration of Concepts	**Poor (Does not meet expectation (1))** The student failed to demonstrate a clear understanding of the assignment concepts	**Fair (Meet Expectation (2-3))** The student demonstrated a clear understanding of some of the assignment concepts	**Good (Exceeds Expectation (4-5)** The student demonstrated a clear understanding of the assignment concepts	**Score** **30%**
Accuracy	The student mis-configured enough signal processing settings that the computer couldn't function properly.	The student configured enough signal processing settings that the computer partially functioned	The student configured the signal processing settings that the computer fully functioned	**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%**

Code 1:

Will generate the signal of different frequencies say 10,20,30,40,50,60 Hz.

```
%Lab 04
clc
clear all

f1 = 10;
t = 0:0.001:1;
y1 = sin(2*pi*f1*t);
subplot(3,2,1)
plot(t,y1)
xlabel('time in seconds')
ylabel('Amplitude')
title('Signal of 10 Hz frequency')
grid on

f2 = 20;
subplot(3,2,2)
y2 = sin(2*pi*f2*t);
plot(t,y2)
xlabel('time in seconds')
ylabel('Amplitude')
title('Signal of 20 Hz frequency')
grid on

f3 = 30;
subplot(3,2,3)
y3 = sin(2*pi*f3*t);
plot(t,y3)
xlabel('time in seconds')
ylabel('Amplitude')
title('Signal of 30 Hz frequency')
grid on

f4 = 40;
subplot(3,2,4)
```

Output:

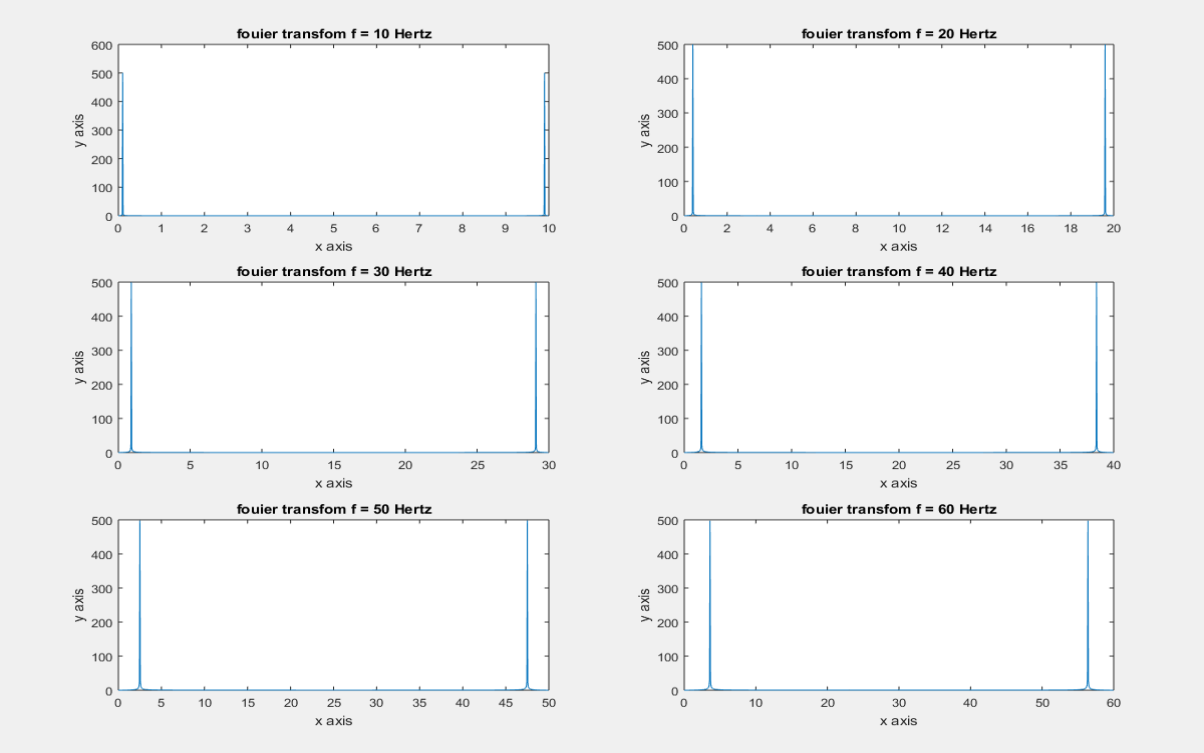

Signal of 10 Hz frequency
Signal of 20 Hz frequency
Signal of 30 Hz frequency
Signal of 40 Hz frequency
Signal of 50 Hz frequency
Signal of 60 Hz frequency
Amplitude
time in seconds

Code2:

Compare the time domain signal and frequency domain signal.

```
60 -    N = length(y1);
61 -    fft_f1 = fft(y1);
62 -    freq_f1 = (0:N-1)*(f1/N);
63 -    subplot(3,2,1);
64 -    plot(freq_f1, abs(fft_f1));
65 -    xlabel('x axis');
66 -    ylabel('y axis');
67 -    title('fouier transfom f = 10 Hertz');
68
69
70
71 -    N = length(y2);
72 -    fft_f2 = fft(y2);
73 -    freq_f2= (0:N-1)*(f2/N);
74
75 -    subplot(3,2,2);
76 -    plot(freq_f2, abs(fft_f2));
77 -    xlabel('x axis');
78 -    ylabel('y axis');
79 -    title('fouier transfom f = 20 Hertz');
80
81
82
83 -    N = length(y3);
84 -    fft_f3 = fft(y3);
85 -    freq_f3= (0:N-1)*(f3/N);
86
87 -    subplot(3,2,3);
88 -    plot(freq_f3, abs(fft_f3));
89 -    xlabel('x axis');
90 -    ylabel('y axis');
91 -    title('fouier transfom f = 30 Hertz');
```

Output:

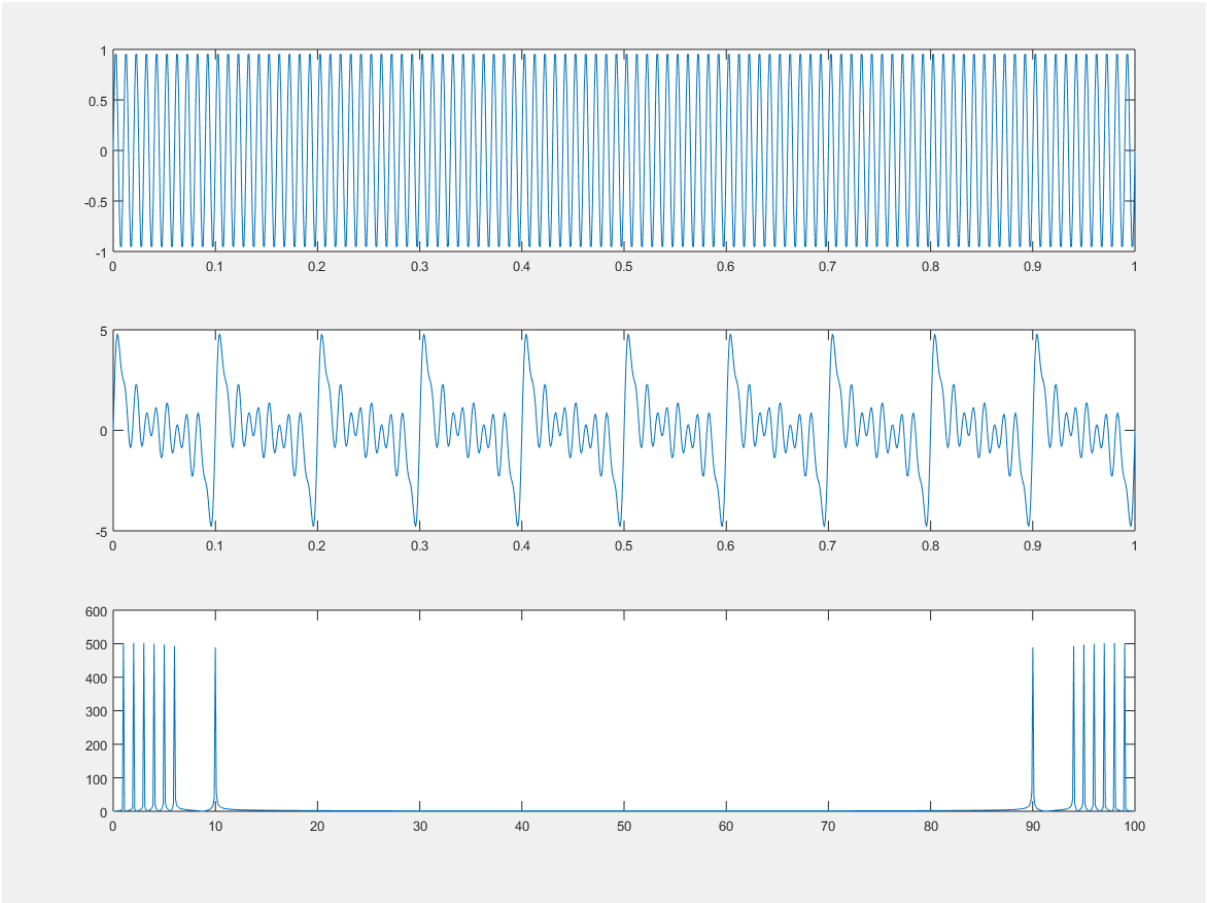


Code3:

```
130
131     %% Addition of all Signal in time domain
132
133 -   time_domain_adder =  y1 + y2 + y3 + y4 + y5 + y6 ;
134 -   plot(t,time_domain_adder);
135
136
137     %% Addition of All signal in Frequency Domain
138
139 -   freq_domanin_adder = fft_f1 + fft_f2 + fft_f3 + fft_f4 + fft_f5 + fft_f6;
140 -   plot(abs(freq_domanin_adder));
141
142
143
144     %% Noise Signal
145
146 -   freq = 100;
147 -   noise = sin(2*pi*freq*t);
148 -   subplot(3,1,1);
149 -   plot(t,noise);
150 -   noise_sum = time_domain_adder+noise;
151 -   subplot(3,1,2);
152 -   plot(t , noise_sum);
153
154
155 -   N = length(noise);
156 -   fft_f7 = fft(noise);
157 -   freq_f7= (0:N-1)*(freq/N);
158 -   sum = freq_domanin_adder+fft_f7;
159 -   subplot(3,1,3);
160 -   plot(freq_f7, abs(sum));
```

`

Output:


1
0.5
0
-0.5
-1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
5
0
-5
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
600
500
400
300
200
100
0
0
10
20
30
40
50
60
70
80
90
100