American International University-Bangladesh (AIUB)

Department of Computer Engineering
COE 3201: Data Communication Laboratory

Lab Report 2

Title: Study of signal frequency, spectrum, bandwidth, bit rate, quantization using MATLAB

Supervised By

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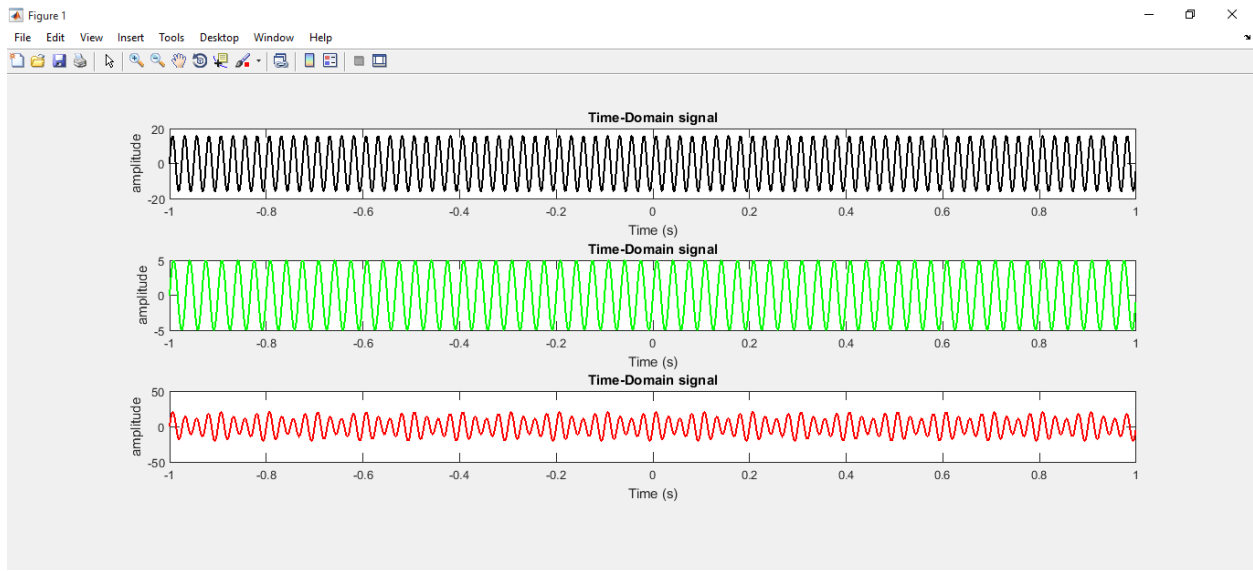
a

A1 = GD = 97

A2 = AF = 23

A1 = 16; % Amplitude of first signal

A2 = 5; % Amplitude of second signal

x1(t) = A1 cos(2π(C*100)t)

x2(t) = A2 cos(2π(F*100)t)

b

fs = 10000; % Sampling frequency

t = 0:1/fs:1-1/fs; % Time duration

C = 40; % Frequency of first signal

F = 30; % Frequency of second signal

```matlab
A1 = 16; % Amplitude of first signal

A2 = 5; % Amplitude of second signal

x1 = A1*sin(2*pi*C*t); % First Signal


subplot(3,1,1)

plot(t,x1,'k','LineWidth',0.3)

title('Time-Domain signal');

xlabel('Time (s)');

ylabel('amplitude');


x2 = A2*sin(2*pi*F*t);

subplot(3,1,2)

plot(t,x2,'g','LineWidth',1.5)

title('Time-Domain signal');

xlabel('Time (s)');

ylabel('amplitude');

x3=x1+x2;

subplot(3,1,3)

plot(t,x3,'r','LineWidth',1.5)

title('Time-Domain signal');

xlabel('Time (s)');

ylabel('amplitude');
```
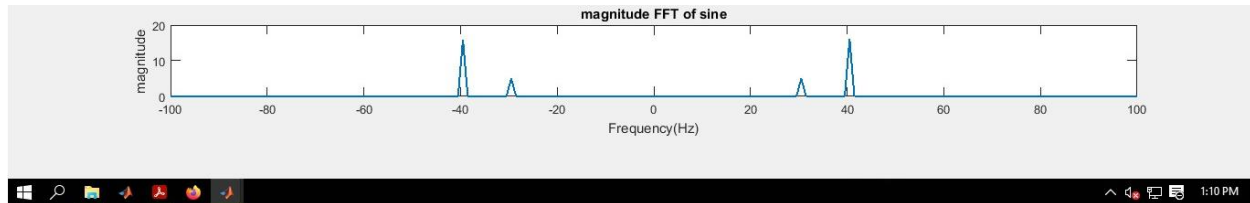
c

fs = 10000; % Sampling frequency

t = 0:1/fs:1-1/fs; % Time duration

C = 40; % Frequency of first signal

F = 30; % Frequency of second signal

A1 = 16; % Amplitude of first signal

A2 = 5; % Amplitude of second signal

x1 = A1*sin(2*pi*C*t); % First Signal

subplot(4,1,1)

plot(t,x1,'k','LineWidth',0.3)

title('Time-Domain signal');

xlabel('Time (s)');

ylabel('amplitude');

x2 = A2*sin(2*pi*F*t);

subplot(4,1,2)

plot(t,x2,'g','LineWidth',1.5)

```
title('Time-Domain signal');

xlabel('Time (s)');

ylabel('amplitude');


x3=x1+x2;

subplot(4,1,3)

plot(t,x3,'r','LineWidth',1.5)

title('Time-Domain signal');

xlabel('Time (s)');

ylabel('amplitude');


fx3 = fft(x3);

fx3 = fftshift(fx3)/(fs/2);

f = fs/2*linspace(-1,1,fs);

subplot(4,1,4)

plot(f, abs(fx3),'LineWidth',1.5);

title('magnitude FFT of sine');

axis([-100 100 0 20])

xlabel('Frequency(Hz)');

ylabel('magnitude');
```

```matlab
26 -    xlabel('Time (s)');
27 -    ylabel('amplitude');
28
29 -    fx3 = fft(x3);
30 -    fx3 = fftshift(fx3)/(fs/2);
31 -    f = fs/2*linspace(-1,1,fs);
32 -    subplot(4,1,4)
33 -    plot(f, abs(fx3),'LineWidth',1.5);
34 -    title('magnitude FFT of sine');
35 -    axis([-100 100 0 20])
36 -    xlabel('Frequency(Hz)');
37 -    ylabel('magnitude');
38
39 -    cx = x1+x2+x3;
40 -    bandwidth = obw(cx,fs)
```
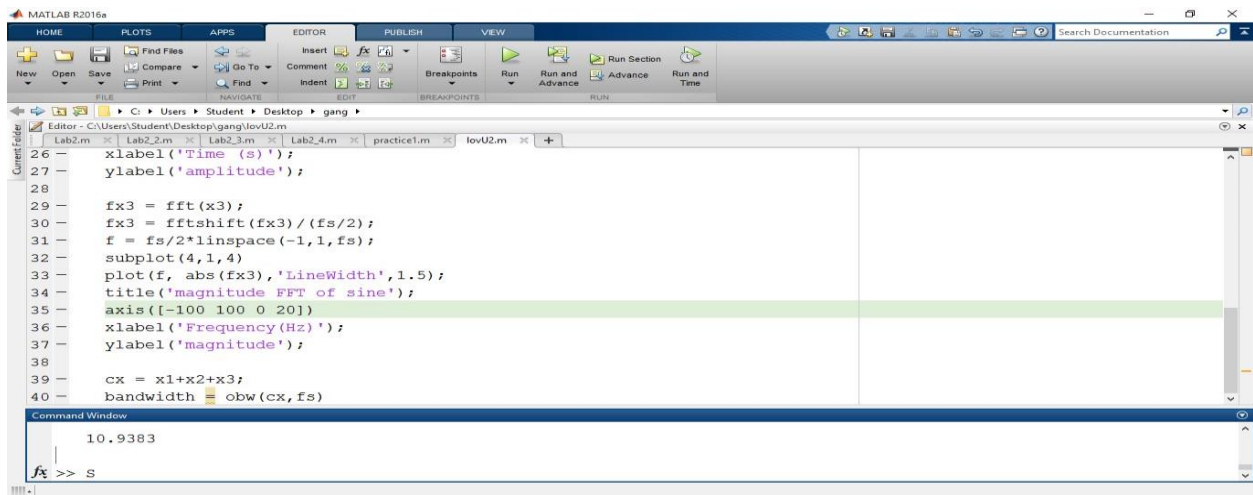
Command Window
```
    10.9383
    |
fx >> S
```

cx = x1+x2+x3;

bandwidth = obw(cx,fs)