AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB)
Faculty of Science & Technology
Undergraduate Program

Course: DATA COMMUNICATION
Fall 2022-23
Section:I
Group: 3
Lab Report-01

Submitted by

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Submitted to

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**Generate two sinusoids with different amplitudes, frequencies, and phases.
x1(t) = K1*cos(2π(E+F+5)t + J1),
x2(t) = K2*cos(2π(C+D+5)t + J2)
The value of the amplitudes are as follows: let **K1** = A+B and **K2** = G+H+2. For the phases, use
J1 = D+G+20 (in degrees), and take **J2** = 30º. **When doing computations in Matlab, make sure to convert degrees to radians**.
(a) Make a plot of both signals on two separate figure windows, over a range of '**t**' that will exhibit approximately **3 cycles**. Make sure that you have enough samples per period of the wave
to have a smooth signal in figure.
(b) Create a third sinusoid as the sum: **x3(t) = x1(t) + x2(t)**. In Matlab this amounts to summing
the vectors that hold the samples of each sinusoid. Make a plot of **x3(t)** over the same range of
time as used in the previous two plots.
(c) Use subplot (3,1,1), subplot (3,1,2), and subplot (3,1,3) to make a three-panel subplot that puts all of three signals (**x1(t), x2(t), and x3(t)**) on the same window. See help subplot.

Answer to the question number (a)

```
clc;
close all;
A=2; %20-42556-1
B=0;
C=4;
D=2;
E=5;
F=5;
G=6;
H=1;
K1= A+B;
K2= G+H+2;
frq1=E+F+5;
J1= (pi*(D+G+20))/180;
```

```
J2= pi/6;
fs=10000;
t=0:1/fs:3/15;
x1 = K1*cos(2*pi*frq1*1*t + J1);
plot(t,x1,'LineWidth',2)
xlabel('Time');
ylabel('Amplitude');
title('X1')
figure
frq2=C+D+5;
x2=K2*cos(2*pi*frq2*t+J2);
plot (t, x2, 'LineWidth',2)
xlabel('Time')
ylabel('Amplitude')
title('X2')
```

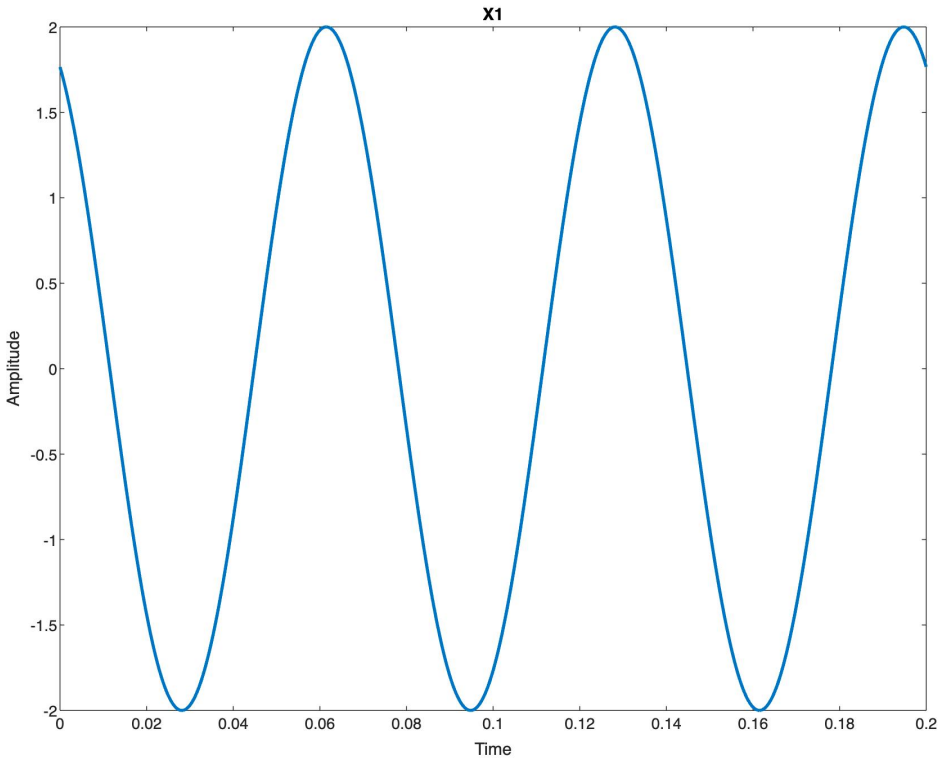

Figure ; a(1)

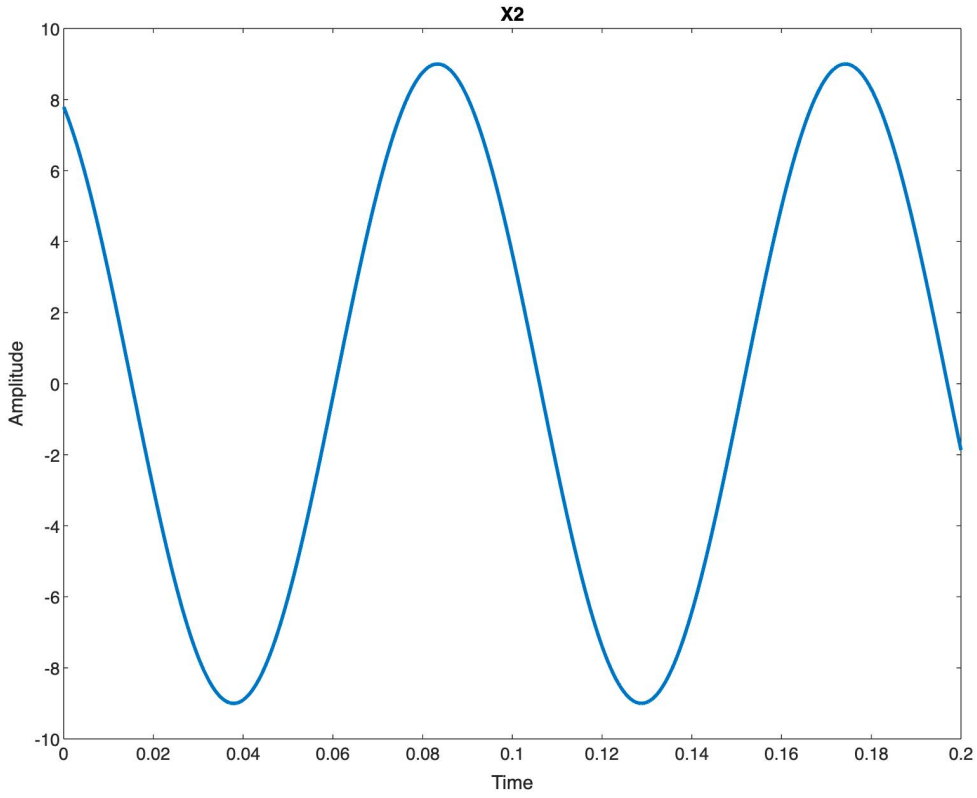

Figure ; a(2)

Answer to the question number (b)

```
clc;
close all;
A=2; %20-42556-1
B=0;
C=4;
D=2;
E=5;
F=5;
G=6;
H=1;
K1= A+B;
K2= G+H+2;
frq1=E+F+5;
J1= (pi*(D+G+20))/180;
```

```
J2= pi/6;
fs=10000;
t=0:1/fs:3/15;
x1 = K1*cos(2*pi*frq1*1*t + J1);
plot(t,x1,'LineWidth',2)
xlabel('Time');
ylabel('Amplitude');
title('X1')
figure
frq2=C+D+5;
x2=K2*cos(2*pi*frq2*t+J2);
plot (t, x2, 'LineWidth',2)
xlabel('Time')
ylabel('Amplitude')
title('X2')
x3=x1+x2;
plot (t, x3, 'LineWidth',2)
xlabel('Time')
ylabel('Amplitude')
title('X3')
```

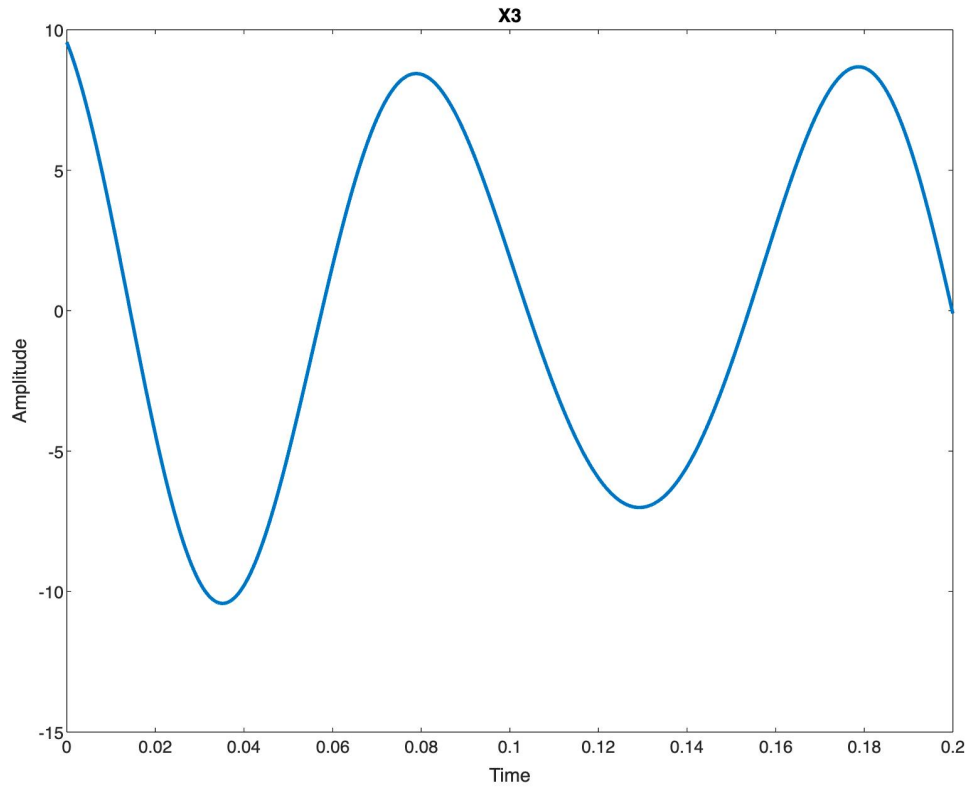

Figure : b

Answer to the question number (c)

```
clc;
close all;
A=2; %20-42556-1
B=0;
C=4;
D=2;
E=5;
F=5;
G=6;
H=1;
K1= A+B;
K2= G+H+2;
frq1=E+F+5;
J1= (pi*(D+G+20))/180;
J2= pi/6;
fs=10000;
t=0:1/fs:3/15;
x1 = K1*cos(2*pi*frq1*1*t + J1);
subplot (3,1,1);
plot(t,x1,'LineWidth',2)
xlabel('Time');
ylabel('Amplitude');
title('X1')
frq2=C+D+5;
x2=K2*cos(2*pi*frq2*t+J2);
subplot (3,1,2);
plot (t, x2, 'LineWidth',2)
xlabel('Time')
ylabel('Amplitude')
title('X2')
x3=x1+x2;
subplot (3,1,3);
plot (t, x3, 'LineWidth',2)
xlabel('Time')
ylabel('Amplitude')
title('X3')
```

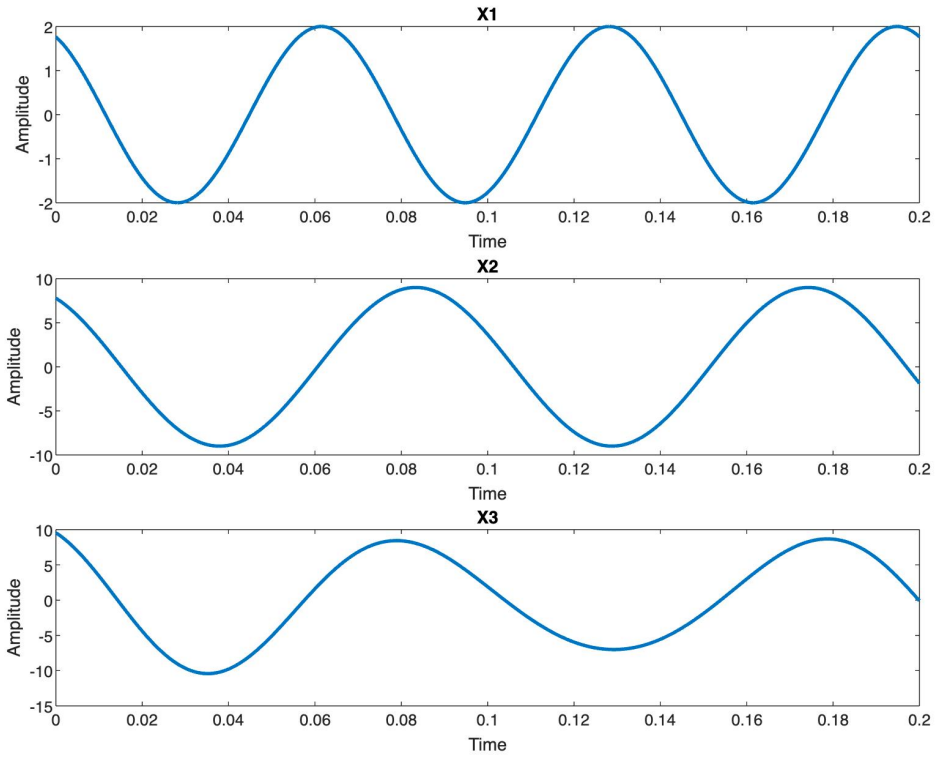

Figure: c