American International University- Bangladesh

COE 3103: DATA COMMUNICATION

Mid Lab Report 01

Spring 2021-2022

Section: **Q**
Date: **11/02/2022**

Submitted by,

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Tasks:

Performance Task for Lab Report: (your ID = AB-CDEFG-H)

**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** = 30°. **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.

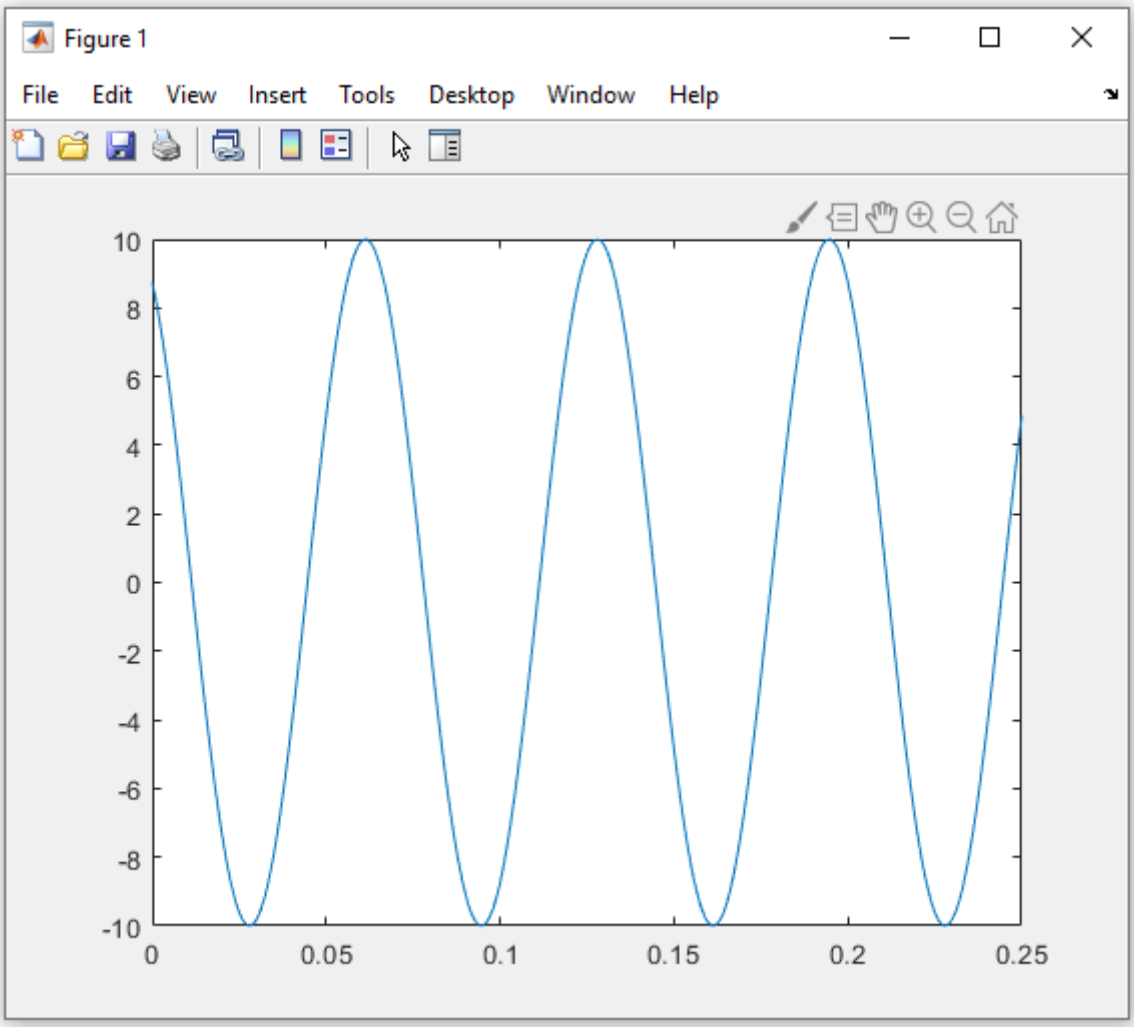
(c) Use subplot (3,1,1), subplot (3,1,2), and subplot (3,1,3) to make a three-panel subplot that puts all of three signals (**x1(t), x2(t), and x3(t)**) on the same window. See help subplot.

Solution:

```
%ID: 19-41468-3
A = 1;
B = 9;
C = 4;
D = 1;
E = 4;
F = 6;
G = 8;
H = 3;

K1 = A+B;
K2 = G+H+2;
J1 = deg2rad(D+G+20);
J2 = deg2rad(30);

t = 0:0.001:0.25;
x1 = K1*cos(2*pi*(E+F+5)*t+J1);
x2 = K2*cos(2*pi*(C+D+5)*t+J2);

%solution of (a)
figure
plot(t,x1) %output in figure 1
figure
```

```
plot(t,x2) %output in figure 2

%solution of (b)
x3 = x1+x2;
figure
plot(t,x3) %output in figure 3

%solution of (c)
figure
subplot(3,1,1),plot(t,x1) %output in figure 4
subplot(3,1,2),plot(t,x2) %output in figure 4
subplot(3,1,3),plot(t,x3) %output in figure 4
```

Figures:



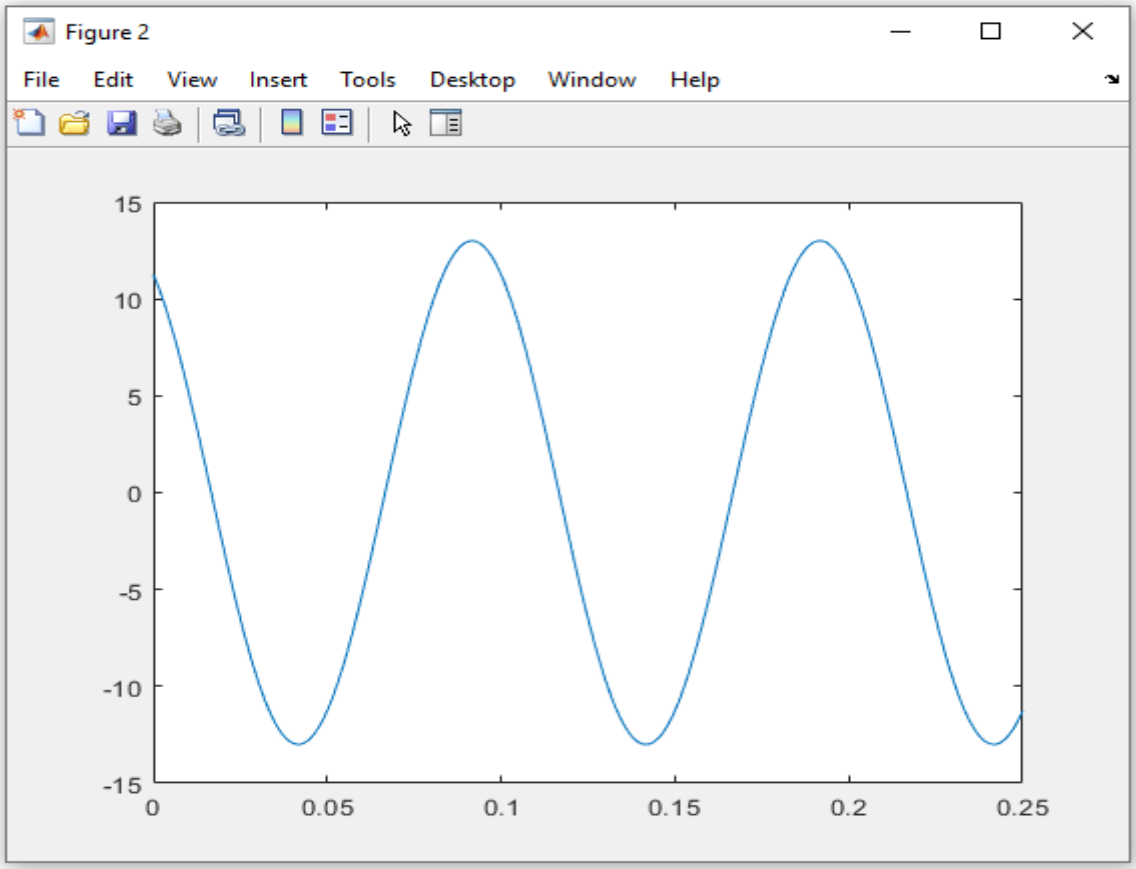


Figure 2
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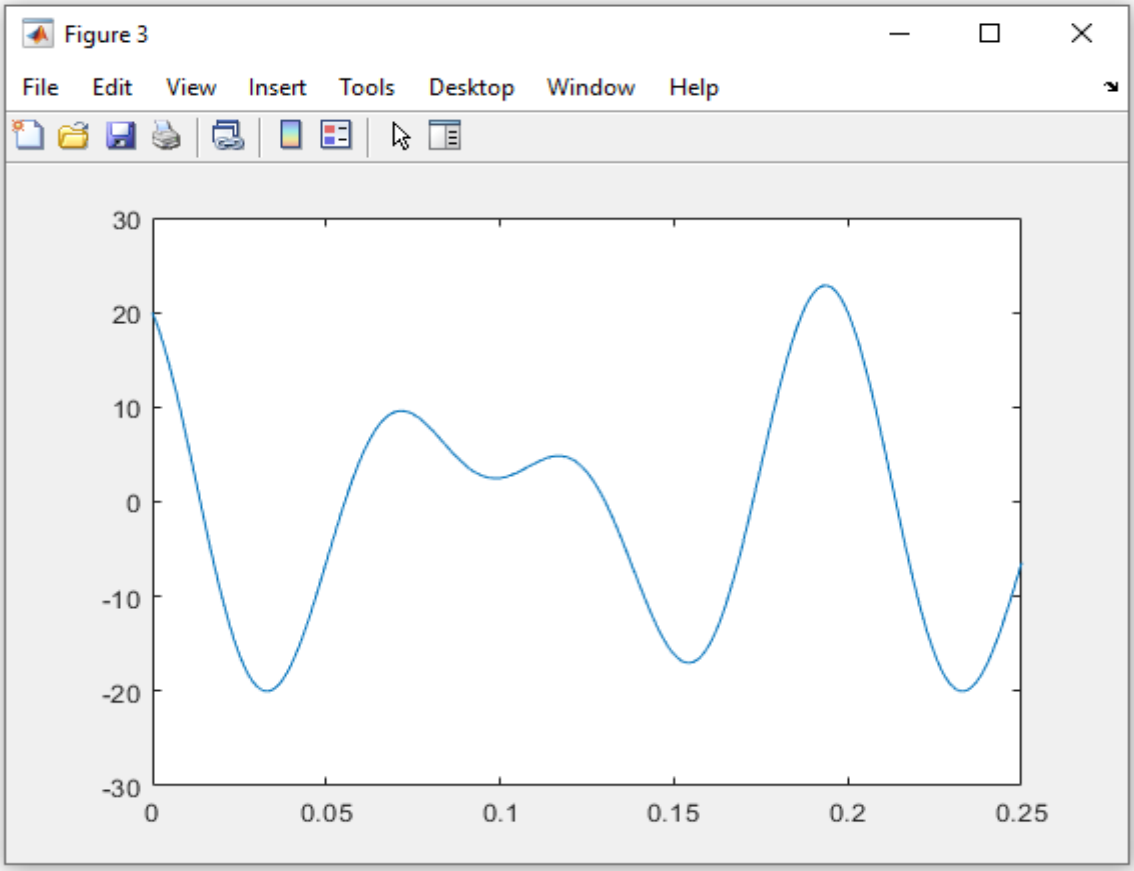
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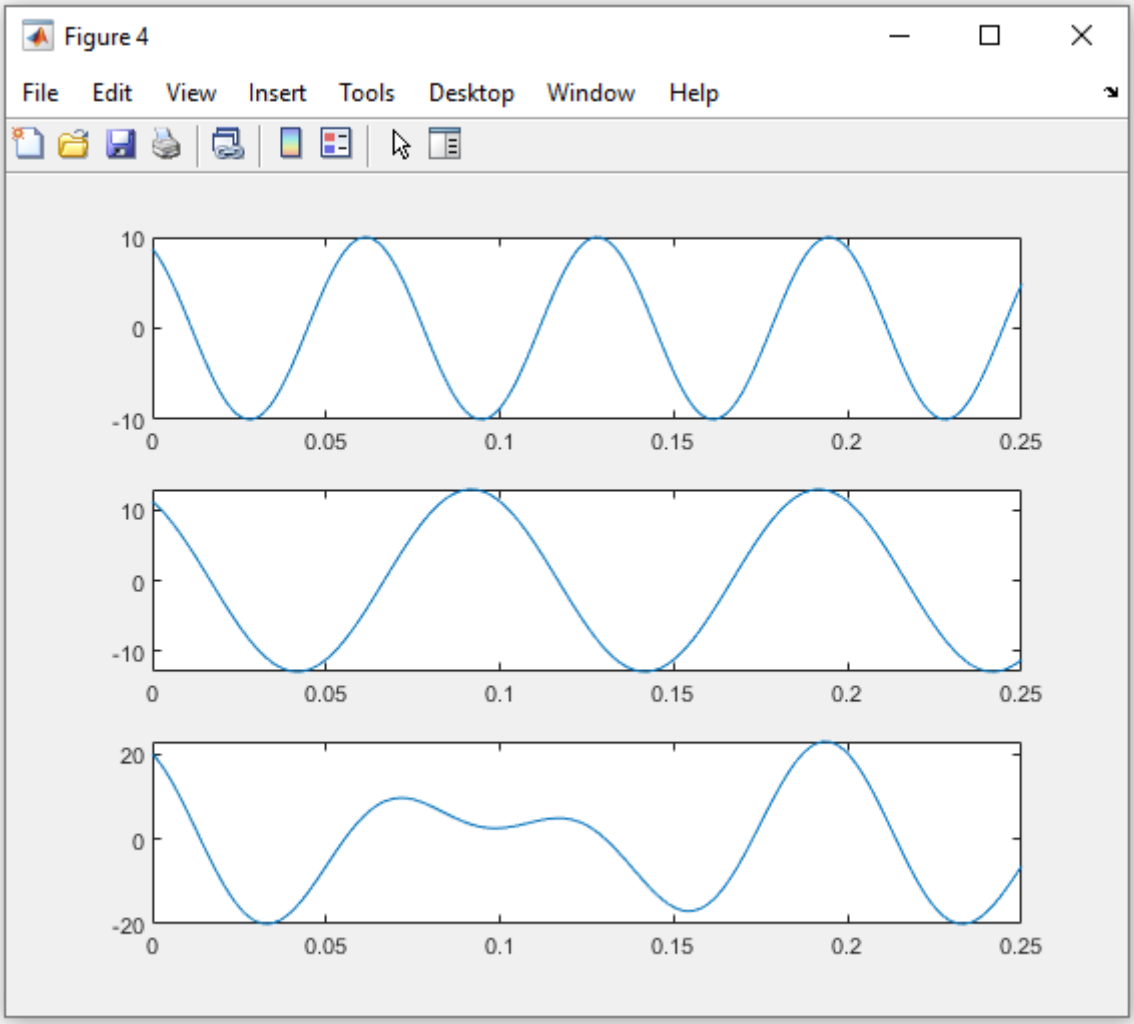
Figure 4
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