American International University-Bangladesh

(AIUB)

FACULTY OF SCIENCE & TECHNOLOGY

Course Name:

DATA COMMUNICATION

Lab Report-1

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So, A = 2, B = 0, C = 4, D = 2, E = 4, F =7, G = 5, H = 1

**Generate two sinusoids with different amplitudes, frequencies, and phases

$x1(t) = K1*\cos(2\pi(E+F+5)t + J1)$, $x2(t) = K2*\cos(2\pi(C+D+5)t + J2)$

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.

Ans:

Now,

K1 =A+B =2+0=2

K2=G+H+2 =5+1+2= 8

J1 = D+G+20° = 2+5+20° =27°

J2 = 30°

So,

$x1(t) = K1*\cos(2\pi(E+F+5)t + J1)$

$= K1*\cos(2\pi(4+7+5)t+J1$

$=K1*\cos(2\pi*16*t+J1$

Again,

$x2(t) = K2*\cos(2\pi(C+D+5)t + J2)$

= K2*cos(2π(4+2+5)t + J2)

= K2*cos(2π*11*t + J2)

Code:

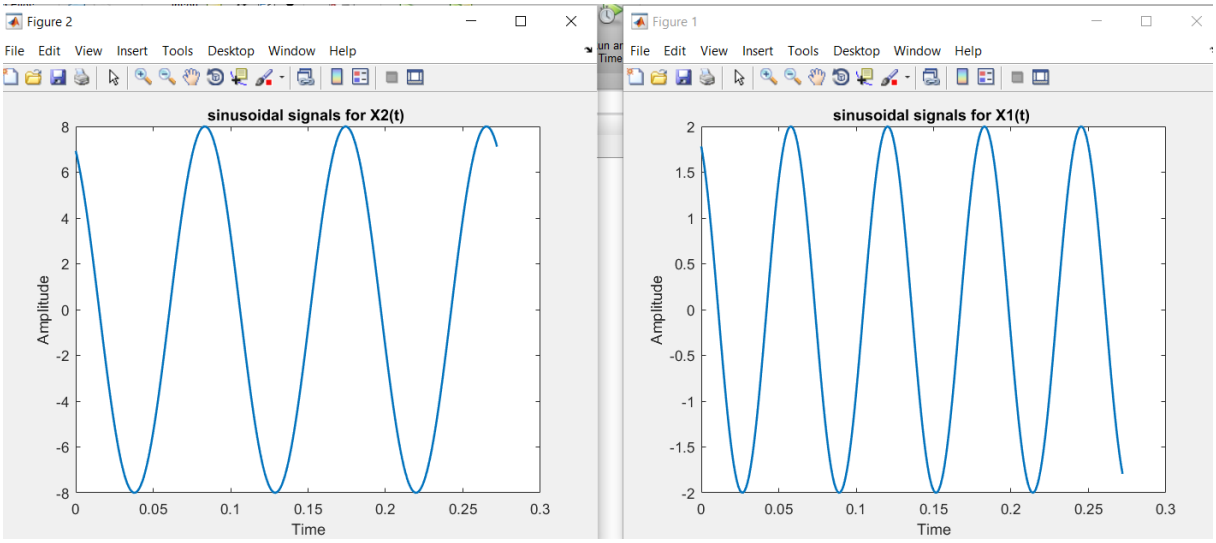
```
A=2;
B=0;
C=4;
D=2;
E=4;
F=7;
G=5;
H=1;
K1 =A+B ;
K2=G+H+2;
J1= (D+G+20) *(pi/180);
J2= 30*(pi/180);

t1=0:0.001:3/11;

X1_t1=K1*cos(2*pi*16*t1+J1);
plot(t1,X1_t1,'linewidth',1.5);
xlabel('Time');
ylabel('Amplitude');
```

```
title('sinusoidal signals for X1(t) ');
figure;
X2_t2=K2*cos(2*pi*11*t1 + J2);
plot(t1,X2_t2,'linewidth',1.5);
xlabel('Time');
ylabel('Amplitude');
title('sinusoidal signals for X2(t) ');
```

Output:



(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.

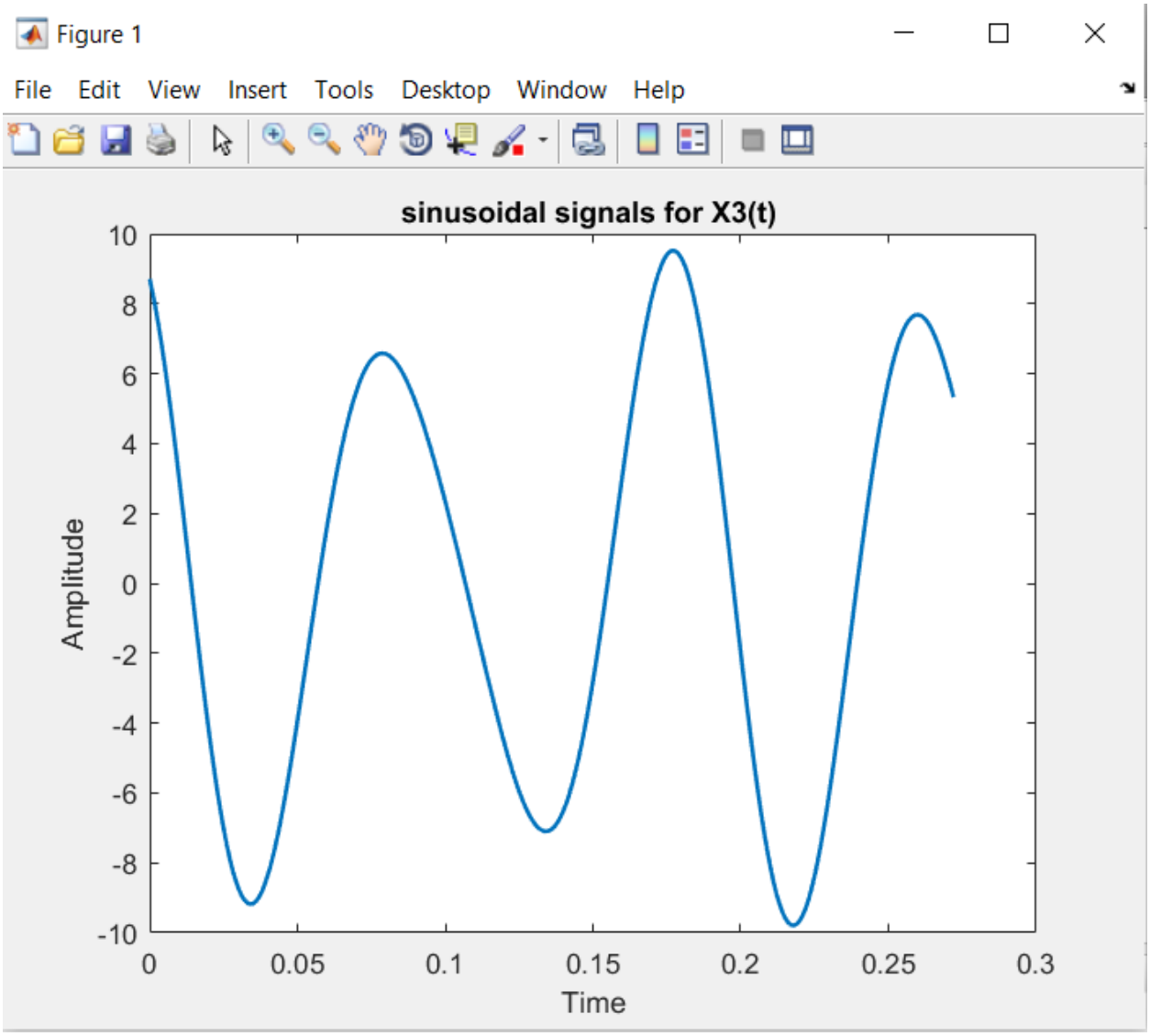
Code:-

```
X3_t3=X1_t1+X2_t2;
plot(t1,X3_t3,'linewidth',1.5);
xlabel('Time');
```

```
ylabel('Amplitude');

title('sinusoidal signals for X3(t) ');
```

Output:-



(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

Code-

```
subplot(311);

plot(t1,X1_t1,'linewidth',1.5);

xlabel('Time');

ylabel('Amplitude');

title('sinusoidal signals for X1(t) ');




subplot(312);

plot(t1,X2_t2,'linewidth',1.5);

xlabel('Time');

ylabel('Amplitude');

title('sinusoidal signals for X2(t) ');




subplot(313);

plot(t1,X3_t3,'linewidth',1.5);

xlabel('Time');
```

```
ylabel('Amplitude');
title('sinusoidal signals for X3(t) ');
```

Output-