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Course Name: Data Communication

Section: D

Lab Report Number: 01

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Lab Performance Task

ID = AB-CDEFG-H

Here, my id is: 20-42195-1

A = 2

B = 0

C = 4

D = 2

E = 1

F = 9

G = 5

H = 1

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

$$x_1(t) = K_1 \cos(2\pi(E+F+5)t + J_1)$$

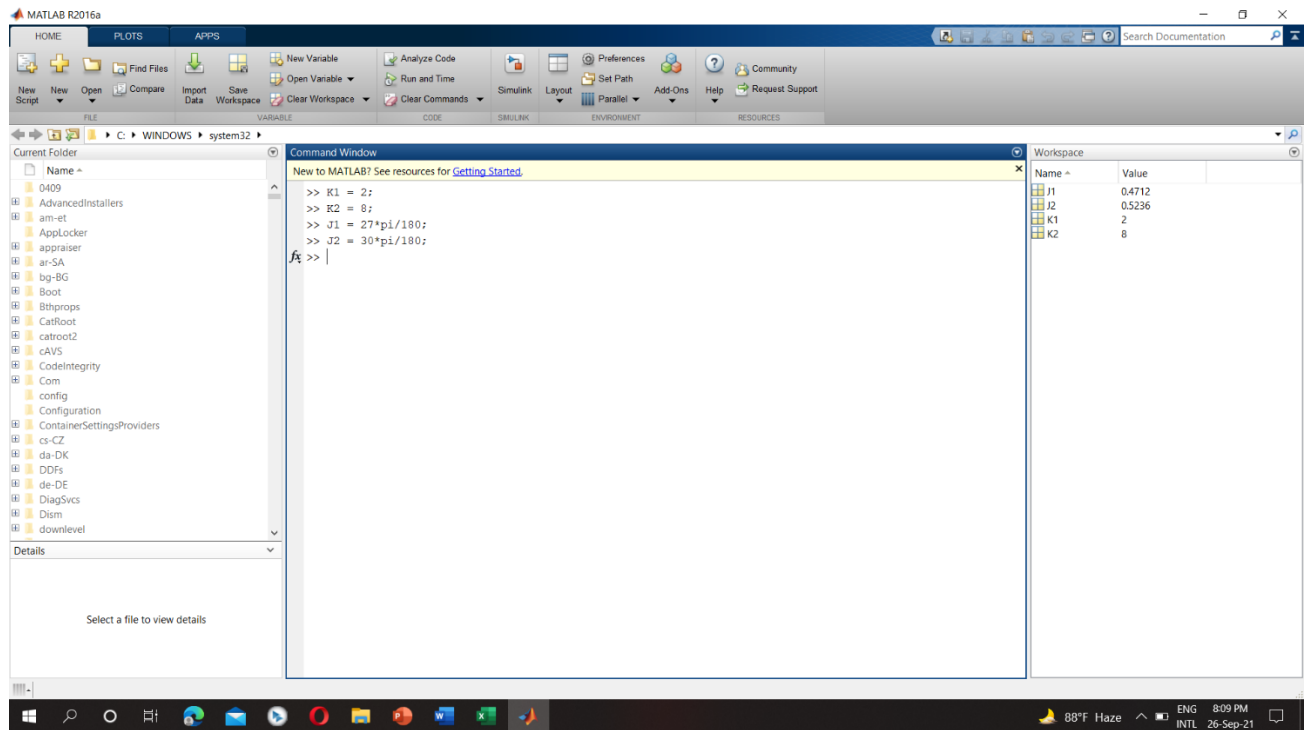
$$x_2(t) = K_2 \cos(2\pi(C+D+5)t + J_2)$$

$$K_1 = A+B = 2 + 0 = 2$$

$$K_2 = G+H+2 = 5 + 1 + 2 = 8$$

$$J_1 = D+G+20 = 2 + 5 + 20 = 27^\circ = 27 \cdot \pi / 180$$

$$J_2 = 30^\circ = 30 \cdot \pi / 180$$



a) $K1 = 2$

$K2 = 8$

$J1 = 27 \cdot \pi / 180$

$J2 = 30 \cdot \pi / 180$

$C = 4$

$D = 2$

$E = 1$

$F = 9$

$t1 = 0:0.0001:0.23$

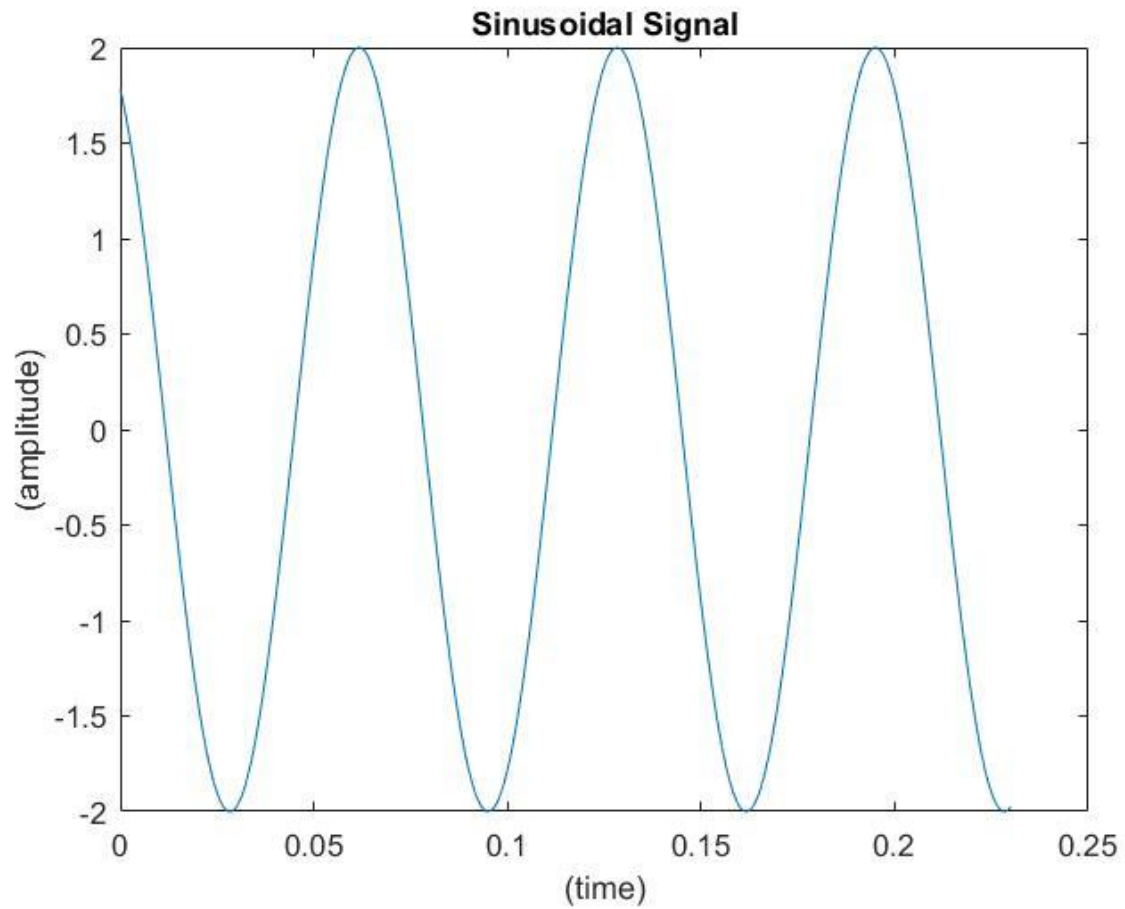
$x1(t1) = K1 \cdot \cos(2\pi(E+F+5)t + J1) = 2 \cdot \cos(2 \cdot \pi \cdot (15) \cdot t1 + 27 \cdot \pi / 180)$

Code:

$t1 = 0:0.0001:0.23;$

$x1 = 2 \cdot \cos(2 \cdot \pi \cdot (15) \cdot t1 + 27 \cdot \pi / 180);$

```
figure;
plot(t1,x1);
xlabel('(time)');
ylabel('(amplitude)');
title('Sinusoidal Signal');
```



```
t2 = 0:0.0001:0.31
```

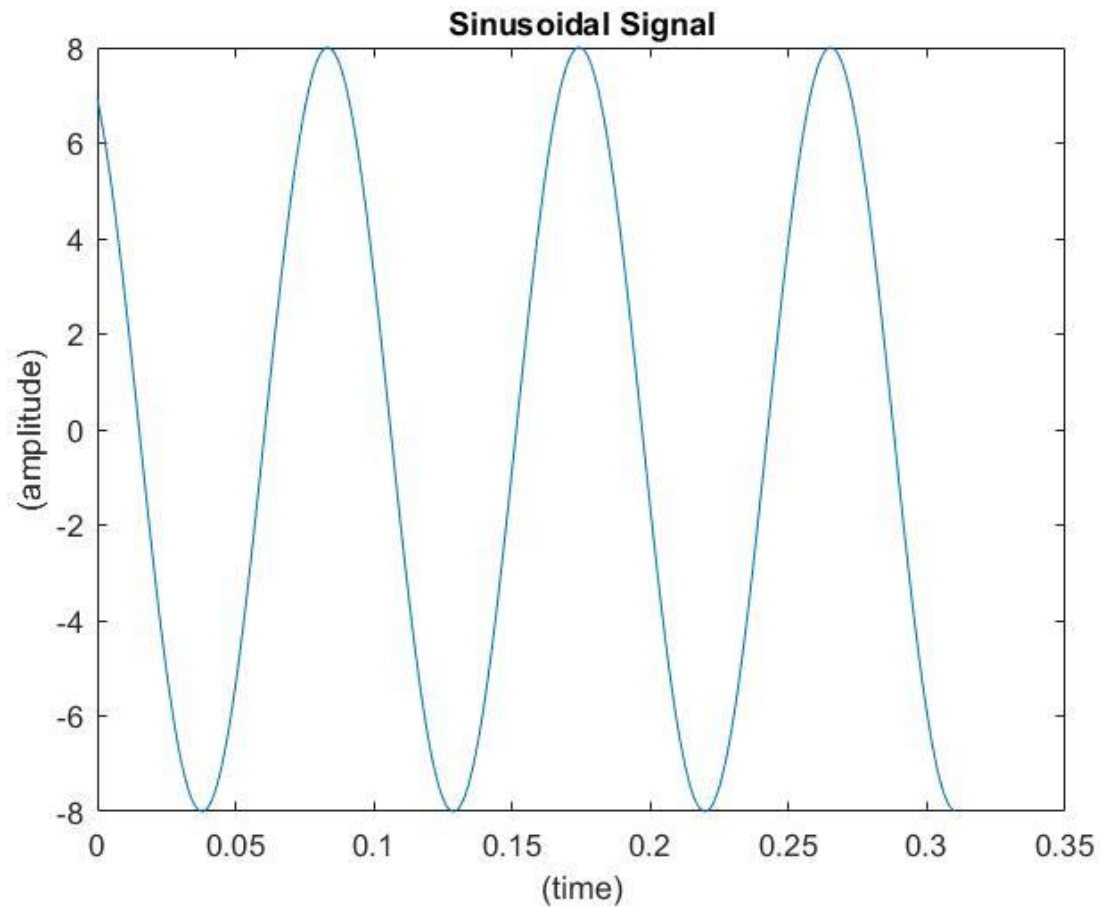
```
x2(t) = K2*cos(2π(C+D+5)t2 + J2) = 8*cos(2*pi*(11)*t2+30*pi/180)
```

Code:

```
t2 = 0:0.0001:0.31;
```

```
x2 = 8*cos(2*pi*(11)*t2+30*pi/180);
```

```
figure;  
plot(t2,x2);  
xlabel('(time)');  
ylabel('(amplitude)');  
title('Sinusoidal Signal');
```



b) $x_3(t) = x_1(t) + x_2(t)$

Code:

```
sampling_rate = 1000;  
sampling_interval = 1/sampling_rate;  
time_array = 0:sampling_interval:0.3;  
x1 = 2*cos(2*pi*(15)*time_array+27*pi/180);
```

```
x2 = 8*cos(2*pi*(11)*time_array+30*pi/180);
```

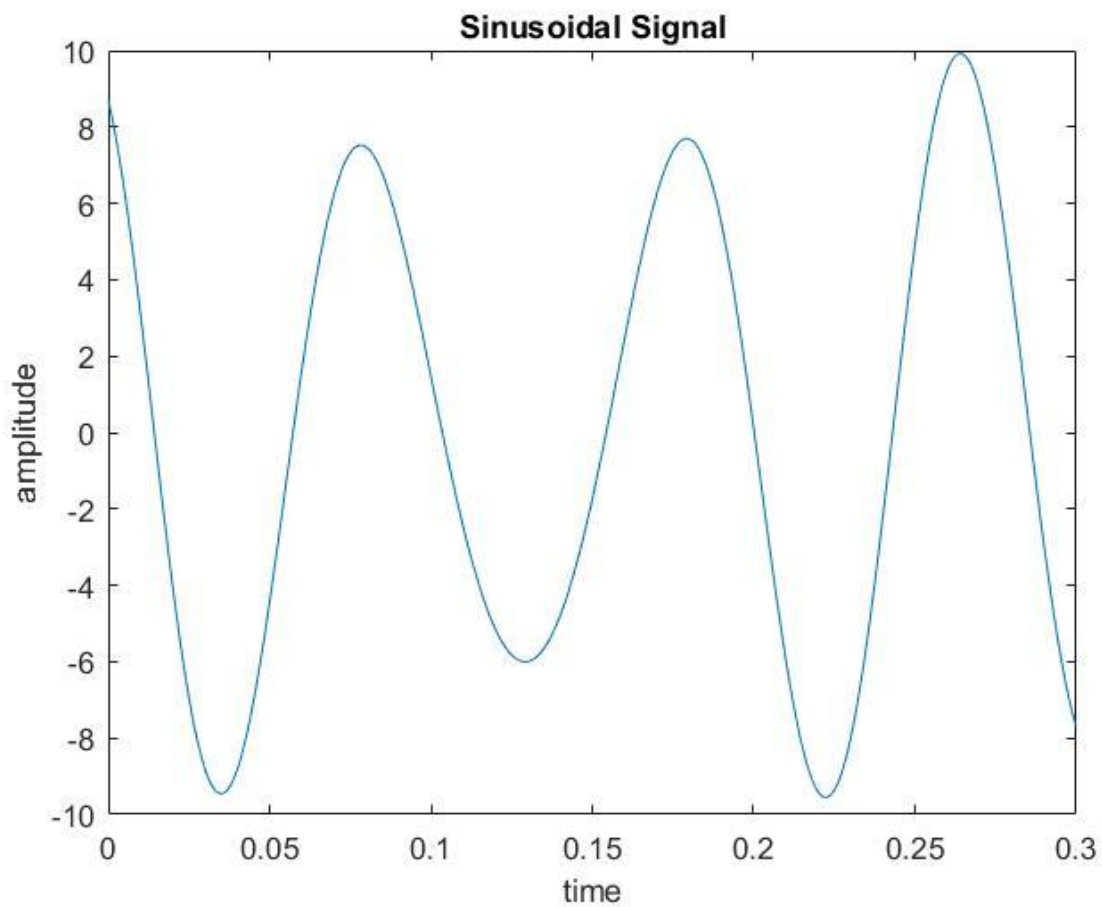
```
x3 = x1 + x2;
```

```
plot(time_array,x3);
```

```
xlabel('time');
```

```
ylabel('amplitude');
```

```
title('Sinusoidal Signal');
```



c) 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 ($x_1(t)$, $x_2(t)$, and $x_3(t)$) on the same window:

Code:

```
sampling_rate = 1000;
```

```
sampling_interval = 1/sampling_rate;
```

```
time_array = 0:sampling_interval:0.3;

sampling_rate = 1000;

sampling_interval = 1/sampling_rate;

time_array = 0:sampling_interval:0.3;

x1 = 2*cos(2*pi*(15)*time_array+27*pi/180);

subplot(3,1,1);

plot(time_array,x1);

xlabel('(time)');

ylabel('(amplitude)');

title('Sinusoidal Signal');

x2 = 8*cos(2*pi*(11)*time_array+30*pi/180);

subplot(3,1,2);

plot(time_array,x2);

xlabel('(time)');

ylabel('(amplitude)');

title('Sinusoidal Signal');

x1 = 2*cos(2*pi*(15)*time_array+27*pi/180);

x2 = 8*cos(2*pi*(11)*time_array+30*pi/180);

x3 = x1 + x2;

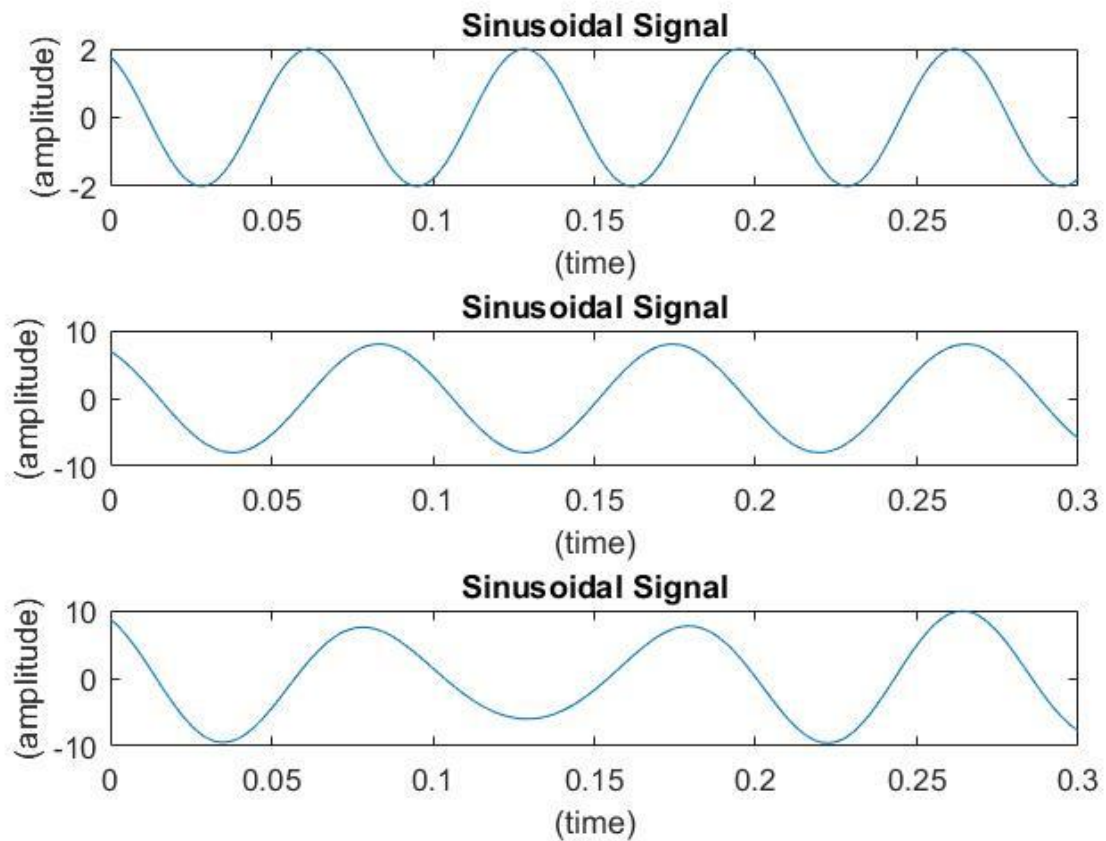
subplot(3,1,3);

plot(time_array,x3);

xlabel('(time)');

ylabel('(amplitude)');

title('Sinusoidal Signal');
```



Discussion:

There is some of the bugs concluded with the definite organizational complementation with the functions of the MATLAB. The regression of the functions originated from the libraries inclines the comprehensive objective of this complementation. I face some problems while creating the plot and also face problems while calculation using my student id number. MATLAB takes some time while I try to run because my laptop configuration is low.