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

**Generate two CDEF hertz sinusoids with different amplitudes and phases.

$x1(t) = A1 \cos(2\pi(CDEF)t + j1)$ $x2(t) = A2 \cos(2\pi(CDEF)t + j2)$

(a) Select the value of the amplitudes as follows: let A1 = AB and A2 = GH. For the phases, use j1

= DG (in degrees), and take j2 = 30°. When doing computations in Matlab, make sure to convert

degrees to radians.

ID : 22-47018-1 (AB-CDEFG-H)

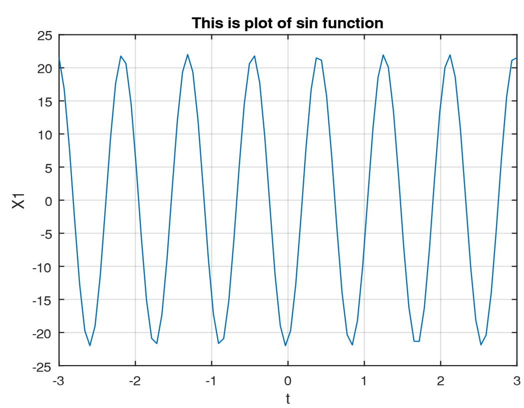
AB = 22(A1), GH = 81 (A2)

CDEF = 4701 (F)

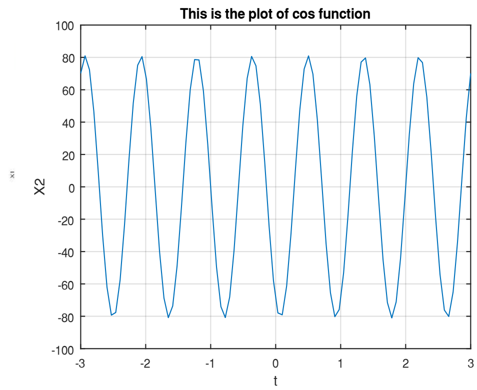
DG = 78 (J1)

J2 = 30

(b) Make a plot of both signals over a range of t that will exhibit approximately 3 cycles. Make sure the plot starts at a negative time so that it will include t = 0, and make sure that you have at least 20 samples per period of the wave.

<table>
<tr><th>MATLAB Code</th><th>Figure</th></tr>
<tr><td>%{
ID = 22-47018-1 AB-CDEFG-H
AB = 22
GH = 81
CDEF = 4701
DG = 78
%}
t = linspace(-3, 3,90);
CDEF = 4701;
A1 = 22;
ph_deg01 = 78;
ph_rad01 = deg2rad(ph_deg01);
x1 = A1*sin(2*pi*CDEF*t +
ph_rad01);
figure;
plot(t, x1)</td><td>
</td></tr>
</table>

```
xlabel('t')
ylabel('X1')
title('This is plot of sin
function')
grid on;

%{
ID = 22-47018-1 AB-CDEFG-H
AB = 22
GH = 81
CDEF = 4701
DG = 78
%}
A2 = 81;
ph_deg02 = 30;
ph_rad02 = deg2rad(ph_deg02);
x2 = A2*cos(2*pi*CDEF*t +
ph_rad02);
figure;
plot(t, x2)
xlabel('t')
ylabel('X2')
title('This is the plot of cos
function')
grid on;
```

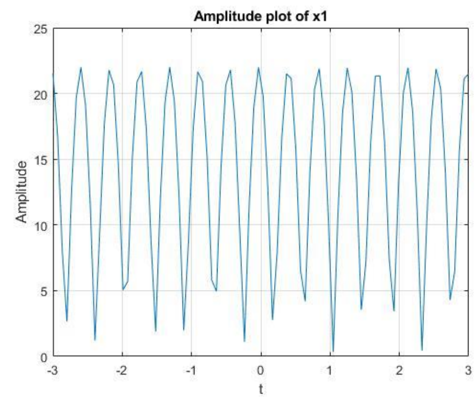


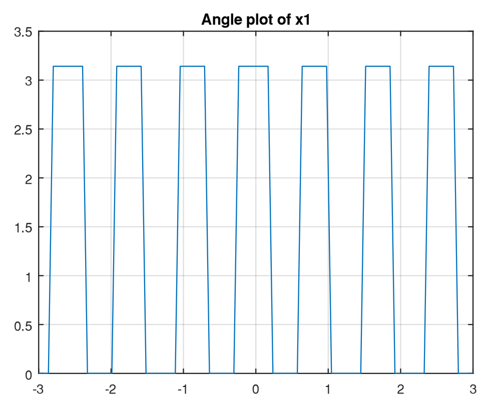
(c) erify that the phase of the two signals x1(t) and x2(t) is correct at t = 0, and also verify that each one has the correct maximum amplitude.

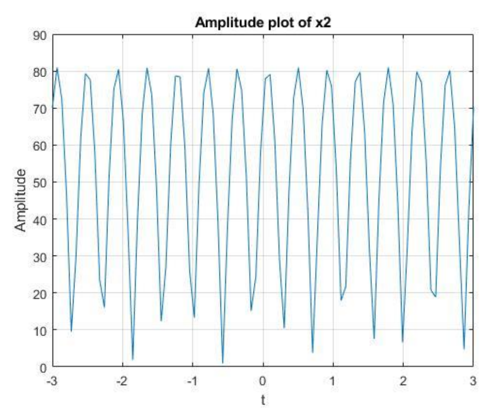
<table>
<tr><th>MATLAB Code</th><th>Output Figure</th></tr>
<tr><td>

```
%{
ID = 22-47018-1 AB-CDEFG-H
AB = 22
GH = 81
CDEF = 4701
DG = 78
%}
t = linspace(-3, 3,90);
CDEF = 4701;
A1 = 22;
ph_deg01 = 78;
ph_rad01 = deg2rad(ph_deg01);
x1 = A1*sin(2*pi*CDEF*t +
ph_rad01);
figure;
plot(t, abs(x1))
title('Amplitude plot of x1')
ylabel('Amplitude')
xlabel('t')
grid on;

figure;
plot(t, angle(x1))
title('Angle plot of x1')
grid on

%{
ID = 22-47018-1 AB-CDEFG-H
AB = 22
GH = 81
CDEF = 4701
DG = 78
%}
A2 = 81;
ph_deg02 = 30;
ph_rad02 = deg2rad(ph_deg02);
x2 = A2*cos(2*pi*CDEF*t +
ph_rad02);
figure;
```

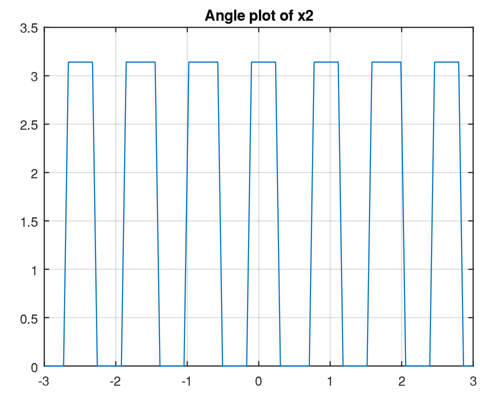
</td><td>





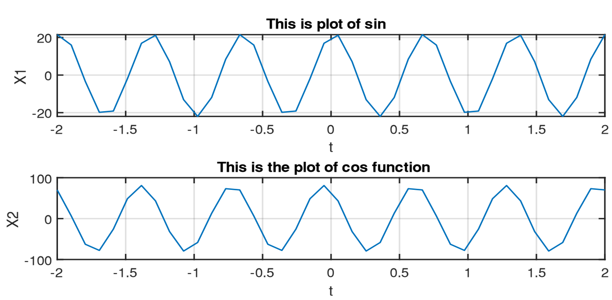


</td></tr>
</table>

`plot(t, abs(x2))`
`title('Amplitude plot of x2')`
`ylabel('Amplitude')`
`xlabel('t')`
`grid on`
 	
`figure;`
`plot(t, angle(x2))`
`title('Angle plot of x2')`
`grid on`
	

(d) Use subplot(3,1,1) and subplot(3,1,2) to make a three-panel subplot that puts both of these plots on the same window. See help subplot.

MATLAB Code	Output Figure

`%{`
`ID = 22-47018-1 AB-CDEFG-H`
`AB = 22`
`GH = 81`
`CDEF = 4701`
`DG = 78`
`%}`
`t = linspace(-2, 2,40);`
`CDEF = 4701;`
`A1 = 22;`
`ph_deg01 = 78;`
`ph_rad01 =`
`deg2rad(ph_deg01);`
`x1 = A1*sin(2*pi*CDEF*t +`
`ph_rad01);`
`subplot(3, 1, 1)`
`plot(t, x1)`
`xlabel('t')`
`ylabel('X1')`
`title('This is plot of`
`sin')`
`grid on;`
`%{`
`ID = 22-47018-1 AB-CDEFG-H`
`AB = 22`
	

<pre>GH = 81
CDEF = 4701
DG = 78
%}
A2 = 81;
ph_deg02 = 30;
ph_rad02 =
deg2rad(ph_deg02);
x2 = A2*cos(2*pi*CDEF*t +
ph_rad02);
subplot(3, 1, 2)
plot(t, x2)
xlabel('t')
ylabel('X2')
title('This is the plot of
cos function')
grid on;</pre>	

(e) 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. Include this as the third panel in the window by using subplot

(3,1,3).

MATLAB Code	Figure

<pre>%{
ID = 22-47018-1 AB-CDEFG-H
AB = 22
GH = 81
CDEF = 4701
DG = 78
%}
t = linspace(-2, 2,40);
CDEF = 4701;
A1 = 22;
ph_deg01 = 78;
ph_rad01 = deg2rad(ph_deg01);
x1 = A1*sin(2*pi*CDEF*t +</pre>	

```
ph_rad01);
subplot(3, 1, 1)
plot(t, x1)
xlabel('t')
ylabel('X1')
title('This is plot of sin')
grid on;

%{
ID = 22-47018-1 AB-CDEFG-H
AB = 22
GH = 81
CDEF = 4701
DG = 78
%}
A2 = 81;
ph_deg02 = 30;
ph_rad02 = deg2rad(ph_deg02);
x2 = A2*cos(2*pi*CDEF*t +
ph_rad02);
subplot(3, 1, 2)
plot(t, x2)
xlabel('t')
ylabel('X2')
title('This is the plot of
cos function')
grid on;


x3 = x1 + x2;
subplot(3, 1, 3);
plot(t, x3, 'r');
xlabel('t')
ylabel('x3')
title('THis is  x3 = x1 +
x2')
grid on
```