Introduction to MATLAB Lab

Report 1

DATA COMMUNICATION [D]

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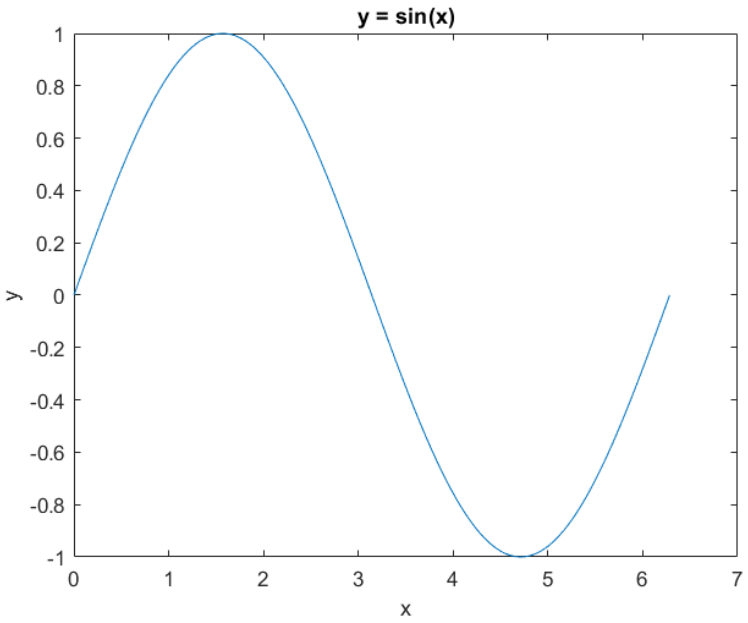
Practices:

a) Sine Plot:

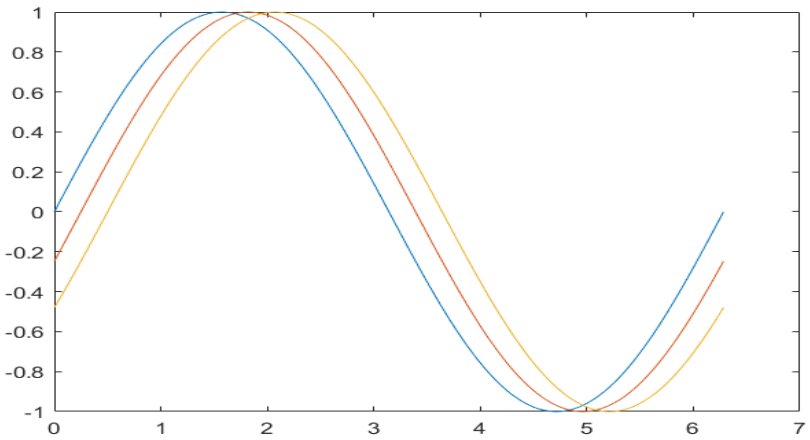
```
xlabel('x');
ylabel('y');
title('y = sin(x)')
```



b)

Multiple graphs with a single call to plot:

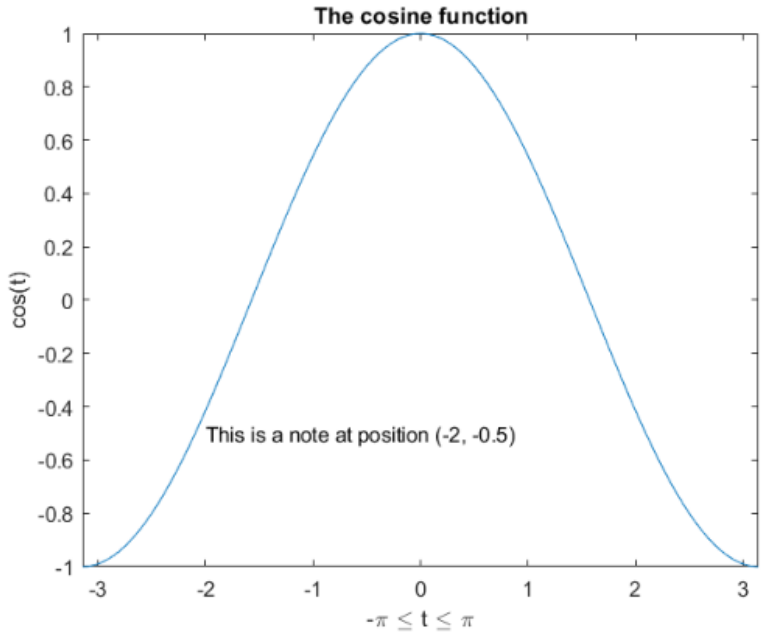
```
x1 = 0:pi/100:2*pi;
y1 = sin(x1);
y2 = sin(x1 - 0.25);
y3 = sin(x1 - 0.5);
plot(x1,y1,x1,y2,x1,y3)
```



C)

Example for controlling the axes:

```
 t = -pi:pi/100:pi;
s = cos(t);
plot(t,s)
axis([-pi pi -1 1])
xlabel("-\pi \leq t \leq \pi")
ylabel('cos(t)')
title('The cosine function')
text(-2, -0.5,'This is a note at position (-2, -0.5)')
```



Lab Task:

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 = 30º. When doing computations in Matlab, make sure to convert degrees to radians.

```
%(a)
%20-42595-1
%AB-CDEFG-H
A1=20
A2=13
CDEF=4259
j1=25*(pi/180)
j2=30*(pi/180)
fs=20000;
t=1:1/fs:1
```

```
A1 = 20
A2 = 13
CDEF = 4259
j1 = 0.4363
j2 = 0.5236

t = 1
```

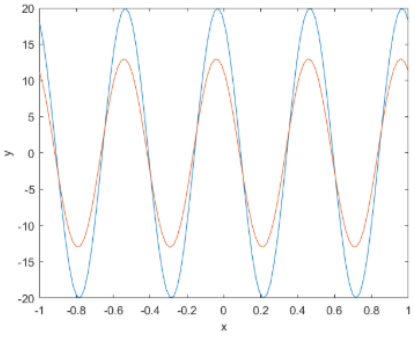
b) Make a plot of both signals over a range of t that will exhibit approximately 3 cycles. Make sure the plot starts at a negative time so that it will include t = 0, and make sure that you have at least 20 samples per period of the wave.

```
%20-42595-1
%AB-CDEFG-H
A1=20
A2=13
CDEF=4259
j1=25*(pi/180)
j2=30*(pi/180)
fs=20000;
t=1:1/fs:1
%(b)
t=linspace(-1,1,100);
x1=A1*cos((2*pi*CDEF*t)+j1);
x2=A2*cos((2*pi*CDEF*t)+j2);

plot(t,x1,t,x2)
xlabel('x');
ylabel('y');
```

```
A1 = 20
A2 = 13
CDEF = 4259
j1 = 0.4363
j2 = 0.5236

t = 1
```



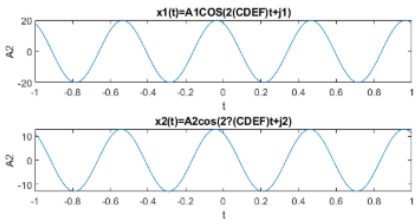
d)

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.

```
%(d)

subplot(3,1,1)
plot(t,x1);
title('x1(t)=A1COS(2(CDEF)t+j1)');
xlabel('t');
ylabel('A2');

subplot(3,1,2)
plot(t,x2);
title('x2(t)=A2cos(2?(CDEF)t+j2)');
xlabel('t');
ylabel('A2');
```



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).

```
%(e)
subplot(3,1,1);
plot(t,x1);
title('x1(t)=A1 cos(2?(CDEF)T+J1');
xlabel('t');
ylabel('x1');

subplot(3,1,2);
plot(t,x2);
title('x2(t)=A2 cos(2?(CDEF)t+j2');
xlabel('t');
ylabel('x2');

x3=x1+x2;
subplot(3,1,3);
plot(t,x3);
title('x3=x1+x2');
xlabel('t');
ylabel('x3');
```