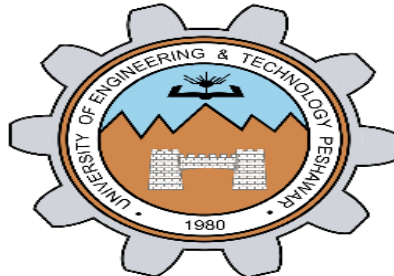


LAB REPORT NO 6



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Class Section: A

“On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work.”

Submitted to:

Engr. Durr-e-Nayab

Data: (04,06,2021)

Department of Computer Systems Engineering

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Objectives: -

- To deal with signals through loops.
- To examine the change in amplitude, frequency and phase of signals.
- To learn effect on different sinusoid with varying frequency or phase etc.

Task no 1: -

```
clc
clear all
close all
v=1:cos(i*pi/4):10
```

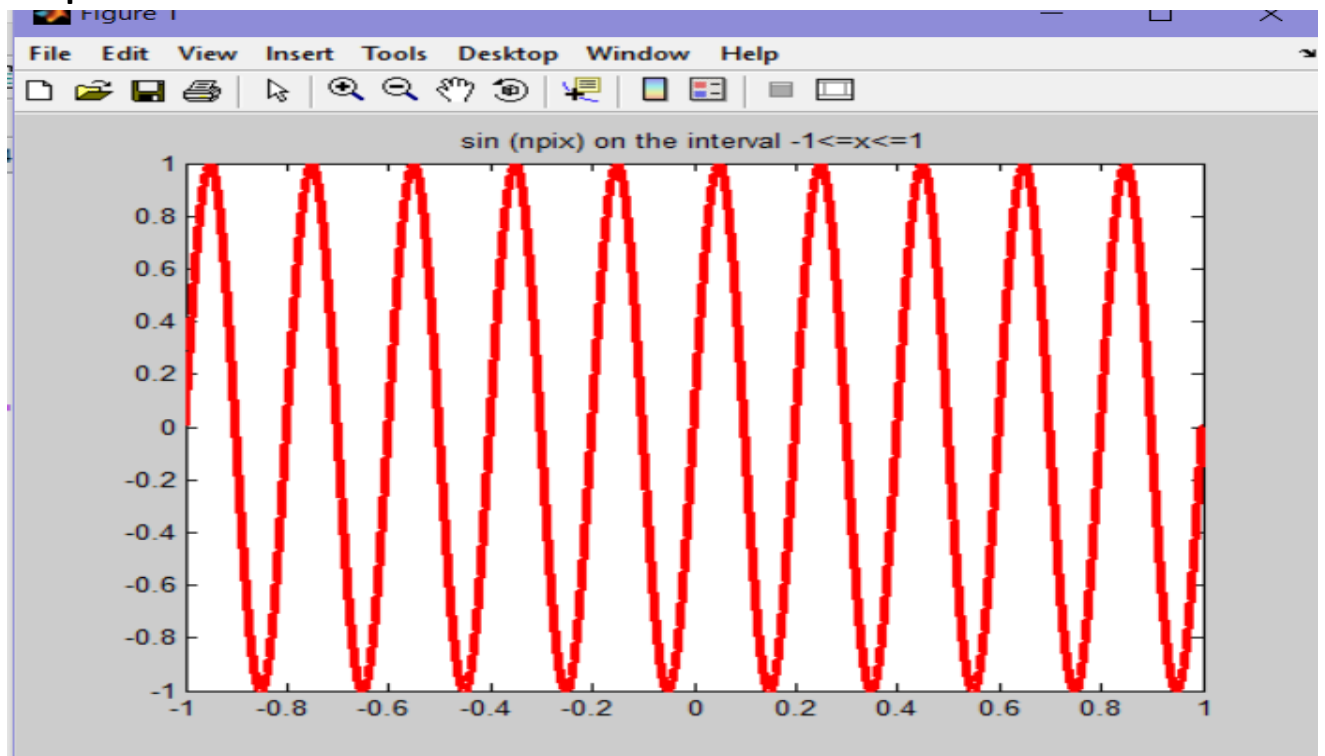
Output:-

```
v =
    1.0000    2.3246    3.6492    4.9738    6.2984    7.6230    8.9477
>>
```

Task no 2: -

```
Clc
clear all
close all
x=-1:0.0001:1;
for n=1:10;
    sign=sin(n*pi*x);
end
plot(x,sign, 'r','linewidth',3);
title('sin (n*pi*x) on the interval -1?x?1');
```

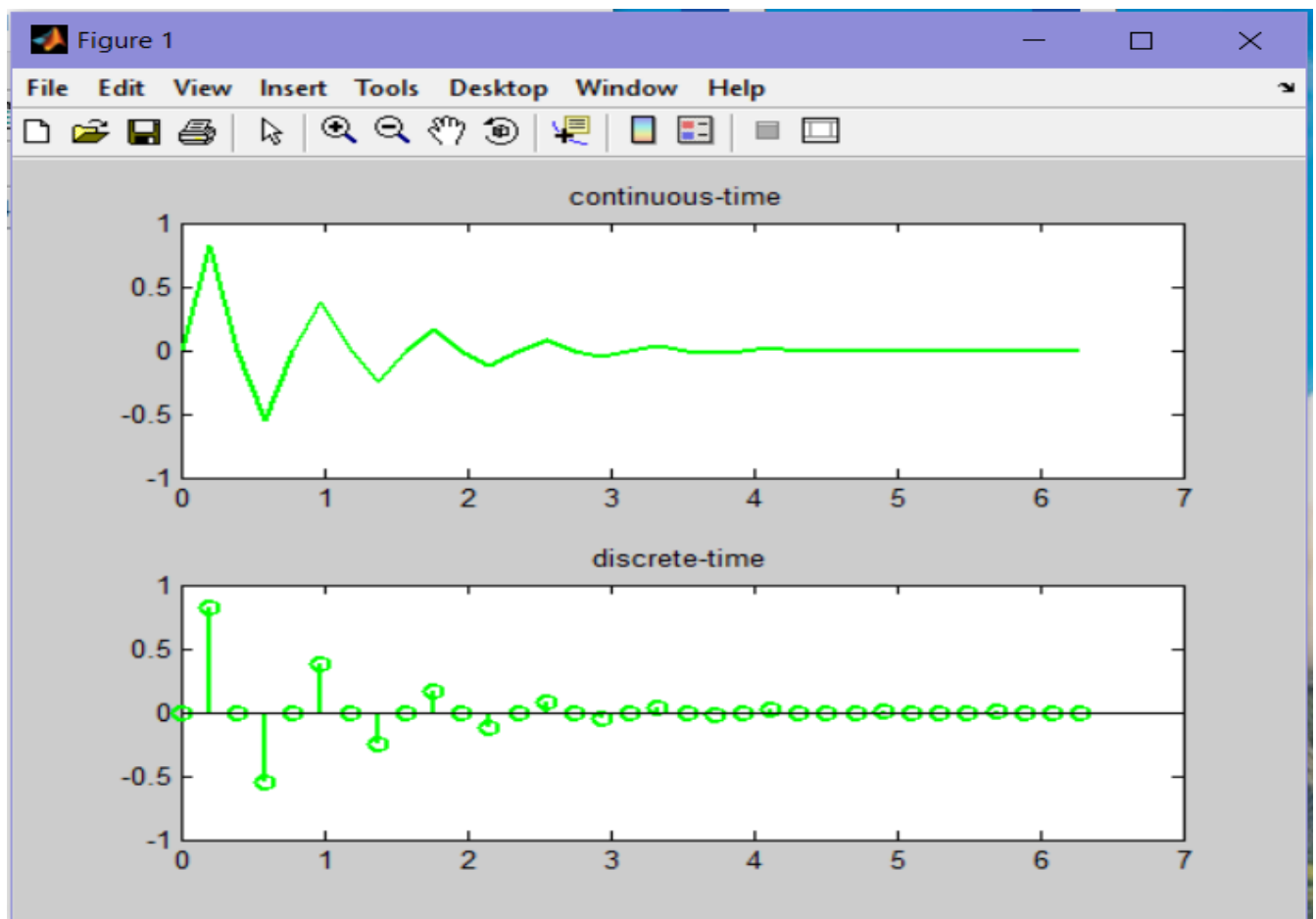
Output: -



Task no 3: -

```
clc
clear all
close all
x=0:pi/16:2*pi;
a=8;
subplot(2,1,1);
sign=sin(a*x).*exp(-x);
plot(x,sign, 'g','linewidth' ,2);
title('continuous-time ');
subplot(2,1,2);
stem(x,sign, 'g','linewidth' ,2);
title('discrete-time');
```

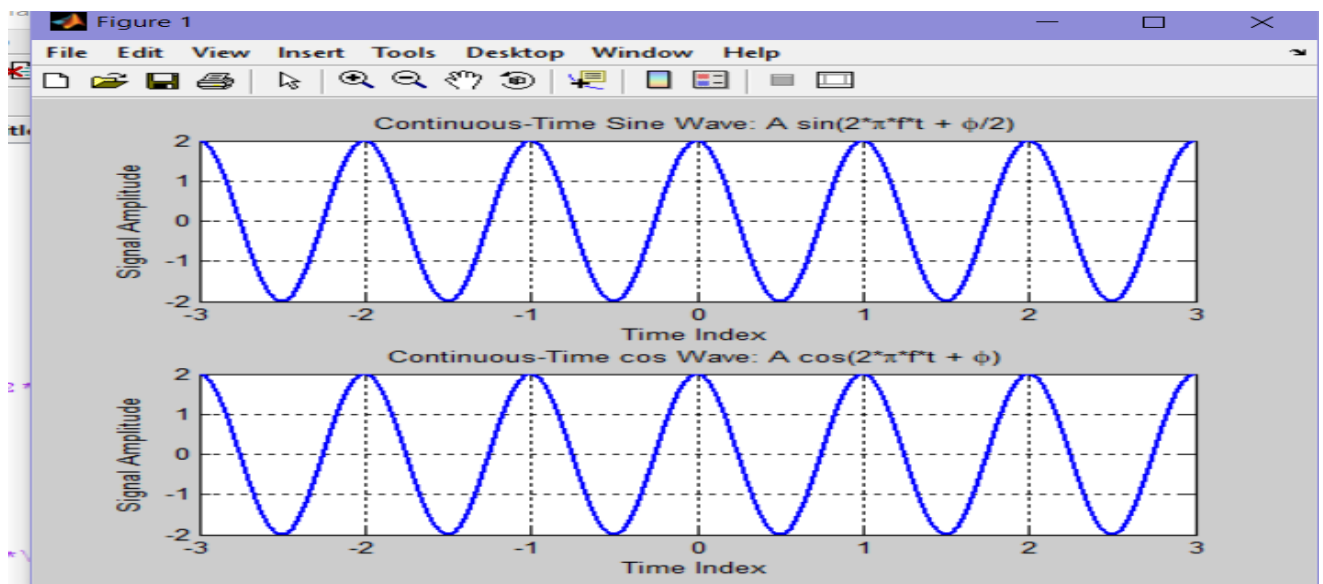
Output:-



Task no 4: -

```
clc;
clear all;
close all;
fs=1000;
t=-3:1/fs:3;
A=2;
f=1;
phase=pi/2;
subplot(2,1,1);
x=A * sin(2*pi*f*t + phase);
plot(t,x, 'linewidth', 2)
title('Continuous-Time Sine Wave: A sin(2*\pi*f*t + \phi/2)')
xlabel('Time Index')
ylabel('Signal Amplitude')
grid
subplot(2,1,2);
phase=0;
x=A * cos(2*pi*f*t + phase);
plot(t,x, 'linewidth', 2)
title('Continuous-Time cos Wave: A cos(2*\pi*f*t + \phi)')
xlabel('Time Index')
ylabel('Signal Amplitude')
axis([t(1) t(end) -A A])
grid
```

Output:-



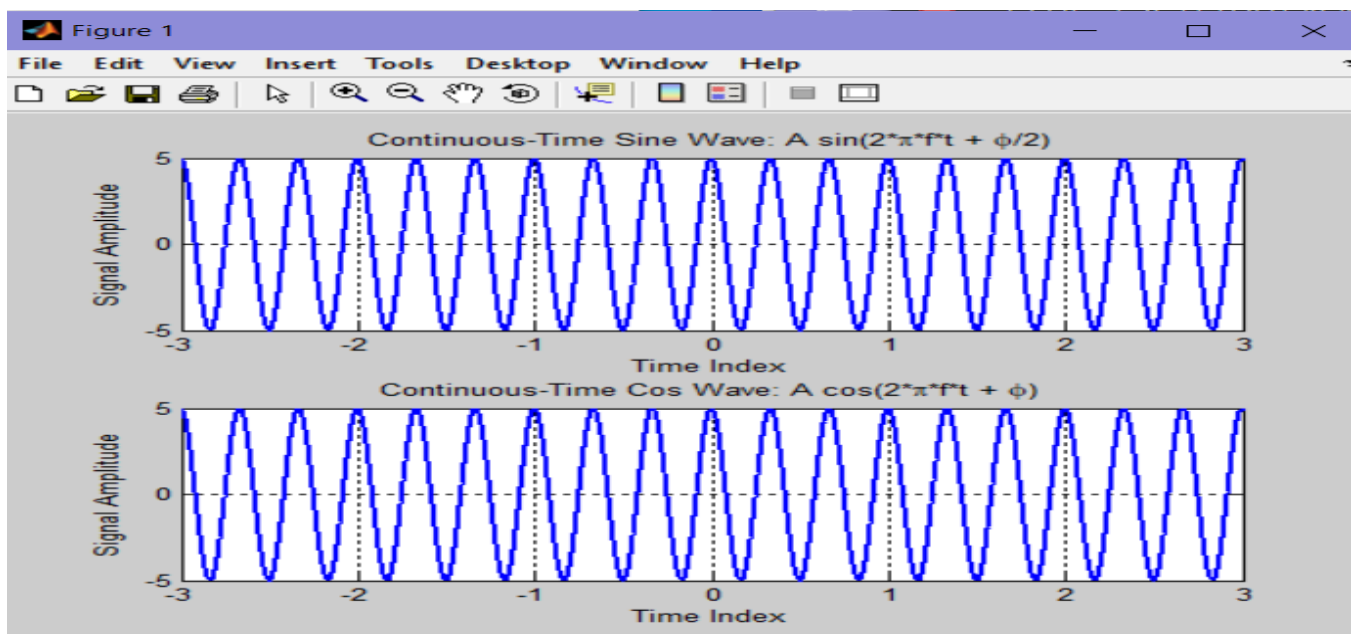
Result:-Both are the same signals, $\sin(2*\pi*f*t + \pi/2) = \cos(2*\pi*f*t + 0)$;

Task no 5: -

```
clc;
clear all;
close all;

t=-3:1/1000:3;
A=5;
f=3;
subplot(2,1,1);
phase=pi/2;
x=A * sin(2*pi*f*t + phase);
plot(t,x, 'linewidth', 2)
title('Continuous-Time Sine Wave: A sin(2*\pi*f*t + \phi/2)')
xlabel('Time Index')
ylabel('Signal Amplitude')
grid
subplot(2,1,2);
phase=0;
x=A * cos(2*pi*f*t + phase);
plot(t,x, 'linewidth', 2)
title('Continuous-Time Cos Wave: A cos(2*\pi*f*t + \phi)')
xlabel('Time Index')
ylabel('Signal Amplitude')
axis([t(1) t(end) -A A])
grid
```

Output:-



Result:- two sinusoid signals having frequency=3, Amplitude=5 with different phase are equal:

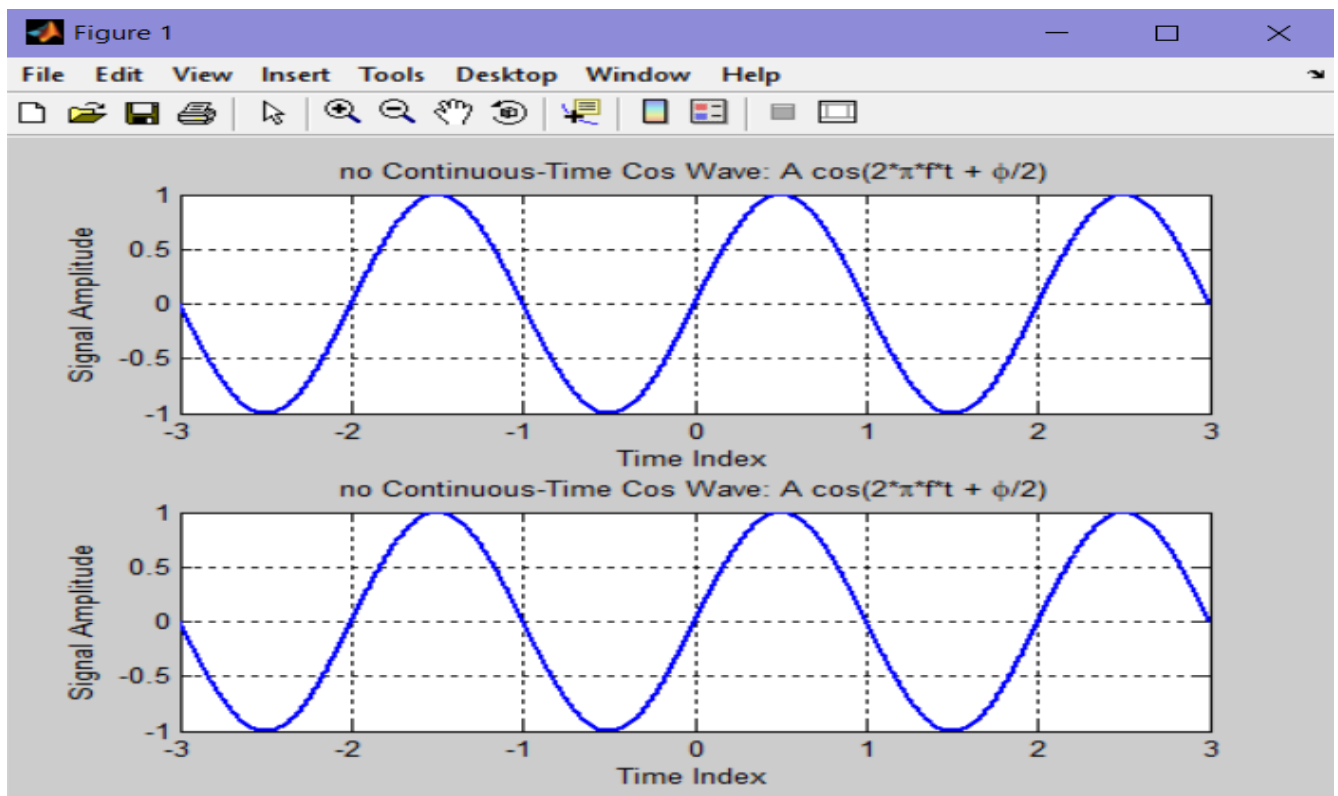
$$5 \cdot \sin(2\pi \cdot 3 \cdot t + \pi/2) = 5 \cdot \cos(2\pi \cdot 3 \cdot t + 0);$$

Task no 6: -

```
clc;
clear all;
close all;
t=-3:1/1000:3;
A=1;
f=0.5;
phase=0;
x=A * sin(2*pi*f*t + phase);
n=input('enter n no of sinusoid ');
for i=1:n;
subplot(n,1,i)
plot(t,x, 'linewidth', 2)
title('no Continuous-Time Cos Wave: A cos(2*\pi*f*t + \phi/2)')
xlabel('Time Index')
ylabel('Signal Amplitude')
grid
end
axis([t(1) t(end) -A A])
```

Output:-

enter n no of sinusoid 2



Result: -User enter no of sinusoid is 2, so 2 sinusoidal signal are generated.

Task no 7: -

```
clc;
clear all;
close all;
t=-2:1/100:2;
A=2;
f=0.5;
phase=0;
n=input('enter n no of sinusoid ');

    for i=1:n;
A=input('enter amplitude of sinusoid ');
x=cos(2*pi*f*t + phase);
x=x*A;
subplot(n,1,i)
plot(t,x, 'linewidth', 2)
title('no Continuous-Time Cos Wave: A cos(2*\pi*f*t + \phi/2)')
xlabel('Time Index')
ylabel('Signal Amplitude')
grid
axis([t(1) t(end) -4 4])
    end
```

Output:-

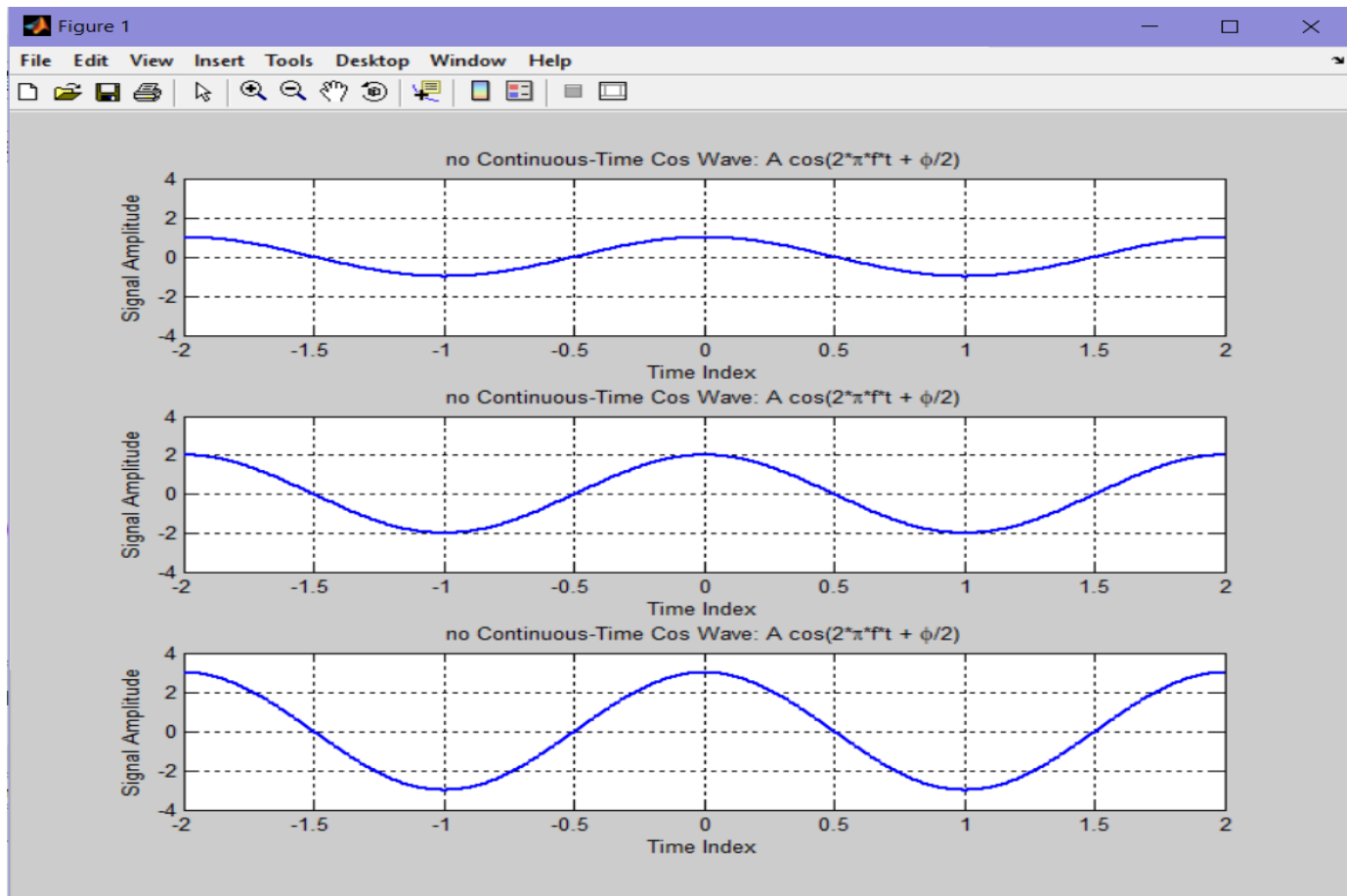
enter n no of sinusoid 3

enter amplitude of sinusoid 1

enter amplitude of sinusoid 2

enter amplitude of sinusoid 3

>>



Result: -User enter no of sinusoid is 3, so 3 sinusoidal signals are generated with different amplitude i-e 1,2,3.

Task no 8: -

```
clc;
clear all;
close all;
t=-2:1/100:2;
A=1;
phase=0;
n=input('enter n no of sinusoid ');

for i=1:n;
f=input('enter frequency of sinusoid ');
x=cos(2*pi*f*t + phase);
subplot(n,1,i)
plot(t,x, 'linewidth', 2)
title('no Continuous-Time Cos Wave: A cos(2*\pi*f*t + \phi/2)')
xlabel('Time Index')
ylabel('Signal Amplitude')
grid
axis([t(1) t(end) -4 4])
end
```

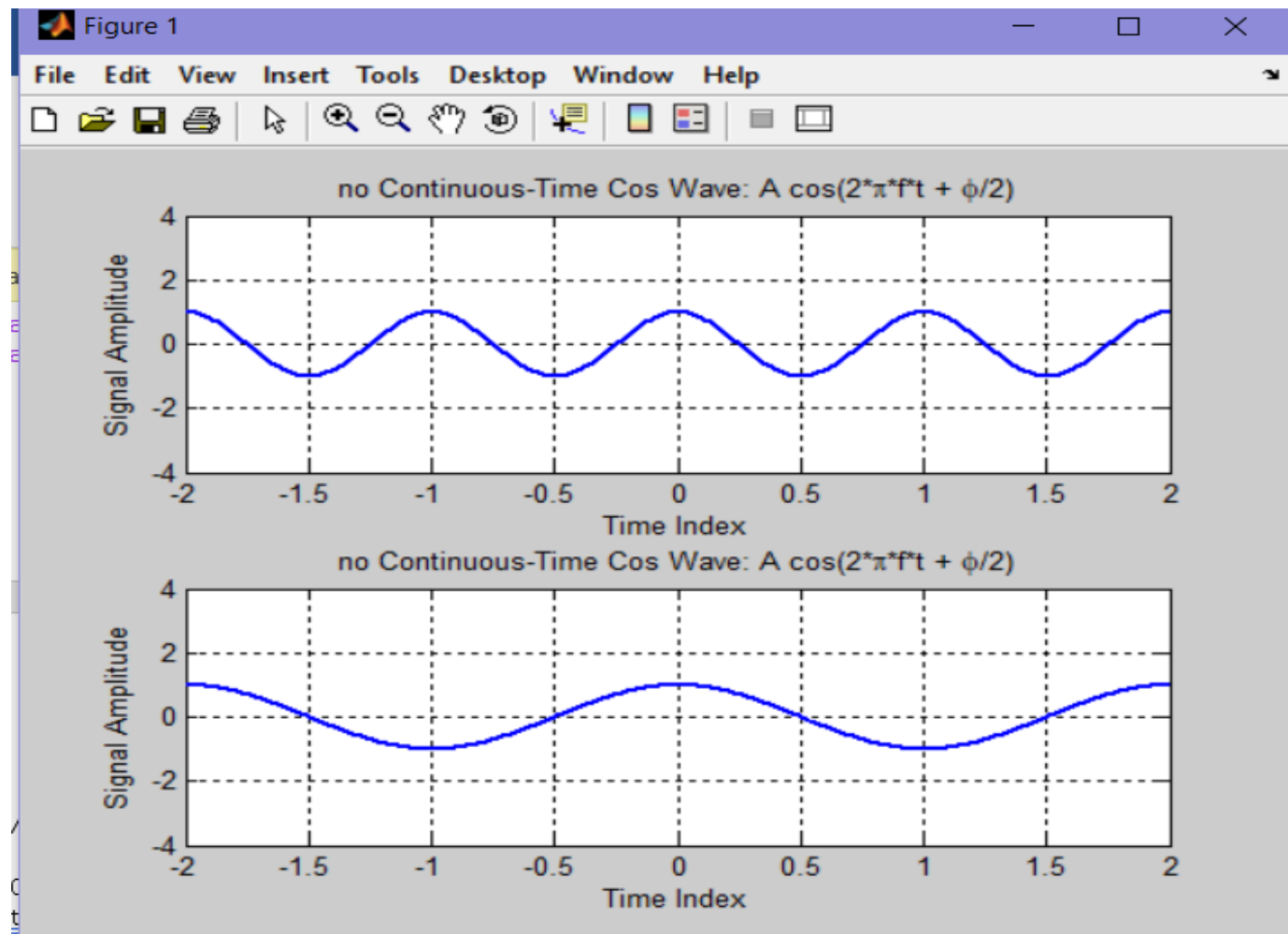

Output:-

enter n no of sinusoid 2

enter frequency of sinusoid 1

enter frequency of sinusoid 0.5

>>



Result: -User enter no of sinusoid is 2, so 2 sinusoidal signals are generated with different frequency i-e 1,0.5.

Task no 9: -

```
clc;
clear all;
close all;
t=-2:1/100:2;
A=1;
f=0.5;
n=input('enter n no of sinusoid ');

    for i=1:n;
phase=input('enter phase of sinusoid ');
x=cos(2*pi*f*t + phase);
subplot(n,1,i)
plot(t,x, 'linewidth', 2)
title('no Continuous-Time Cos Wave: A cos(2*\pi*f*t + \phi)')
xlabel('Time Index')
ylabel('Signal Amplitude')
grid
axis([t(1) t(end) -4 4])
    end
```

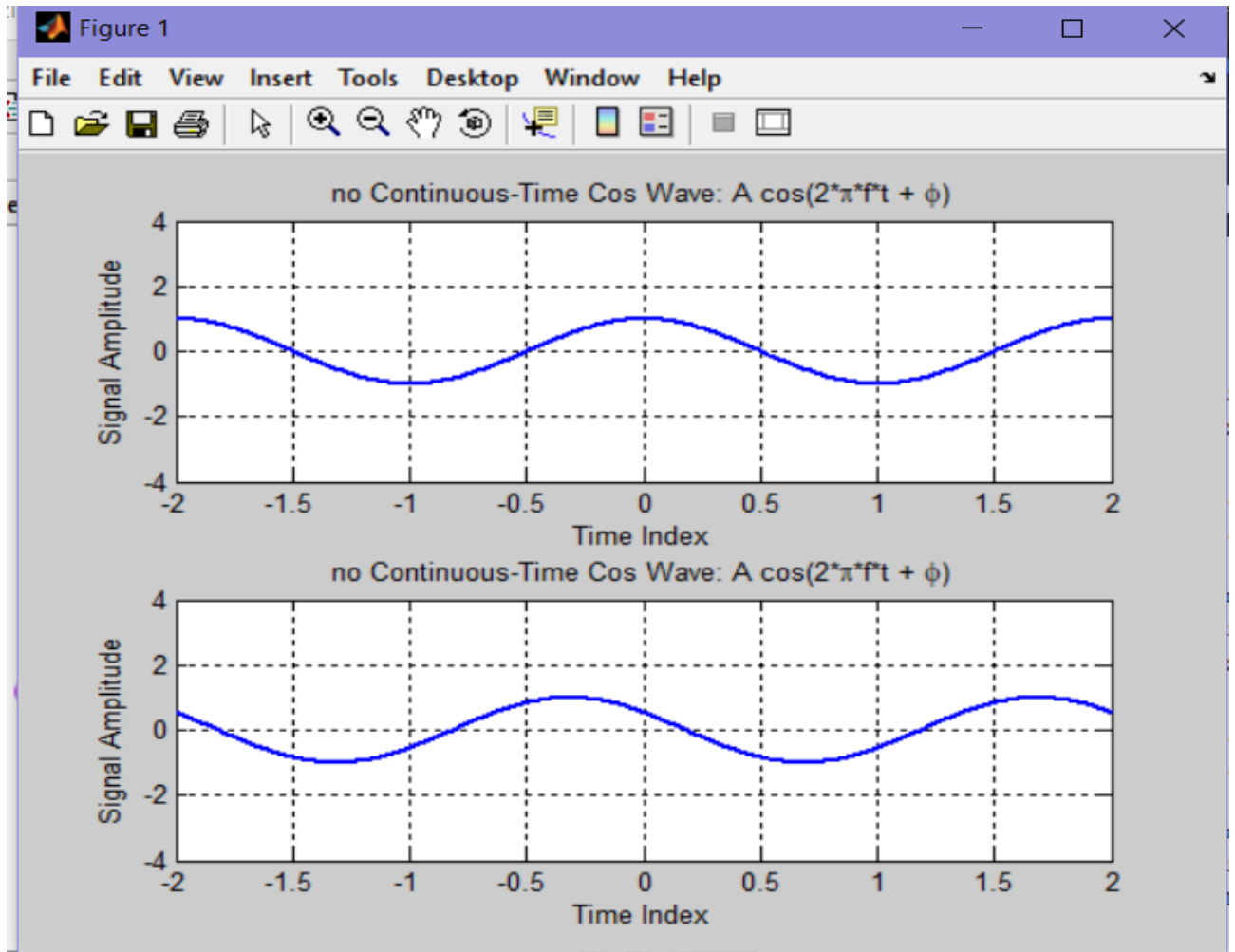
Output:-

enter n no of sinusoid 2

enter phase of sinusoid 0

enter phase of sinusoid 1

>>



Result: -User enter no of sinusoid is 2, so 2 sinusoidal signals are generated with same frequency and amplitude and with different phase i-e 0,1.