# Experiment :-03

Experiment 3

① Write a Matlab Program to plot Sin x and Cos x on a single figure window using HOLD command. Let Sin x be red-coloured and solid and Cos x be blue and dotted line pattern. Also assign a title (Title) 'Sinusoidal Signals' to the Graph. Use linspace, legend and gtext and set.

② Plot $f(t) = -t \sin(t)$, $0 \le t \le 10\pi$ using FPLOT Command

③ Plot Cos x and Sin x on semilog scale.

④ Plot Cos 5x, Sin 5x and Sin 4x on same plot.

⑤ Plot Sin t, Cos t with t = 0 to 2π using Plot 3 Command.

⑥ Plot a 3D function and use VIEW(2) command and 'title' them with 3D view and View(2) respectively.

⑦ Write a Matlab Program to plot a function using Plot 3 Command and View command. For plot3(x,y,z), x = Cos(t), y = Sin(t) and z = t and for view (0,0), (0,90) and (90,0) and Title them accordingly.

⑧ Plot Write a Matlab program to plot a 3D function using View(3) Command

⑨ Write a Matlab program to colour different shapes and patterns on a 2D and 3D image using Fill, Use of Meshgrid, Contour, Surf Command to draw different 3D shapes and 3D images.

⑩ Write a Matlab Program to plot the 3D image for $y = x \exp(-x^2 - y^2)$ using meshgrid and surf(x,y,z) and surf(z) commands.

# Commands used in the MATLAB program:

1)Plot- plot(X,Y) creates a 2-D line plot of the data in Y versus the corresponding values in X.

2)Hold- Retain current plot when adding new plots.

3)Grid- Display or hide axes grid lines.

4)linspace- Generate linearly spaced vector.

5)Legend- Add legend to axes.

6)Gtext- Add text to figure using mouse.

7)Fplot- Plot expression or function.

8)Plot3- 3-D point or line plot.

9)Subplot- Create axes in tiled positions.

10)View- Camera line of sight.

11)Set- Set graphics object properties.

12)Cylinder- cylinder( r ) returns the x-, y-, and z- coordinates of a cylinder with the specified profile curve, r , and 20 equally spaced points around its circumference.

13)Peaks :- peaks function is useful for demonstrating graphics functions, such as contour , mesh ,

pcolor , and surf . It is obtained by translating and scaling Gaussian distributions.

14.view(2) sets the default two-dimensional view, az = 0, el = 90.

15.view(3) sets the default three-dimensional view, az = -37.5, el = 30.

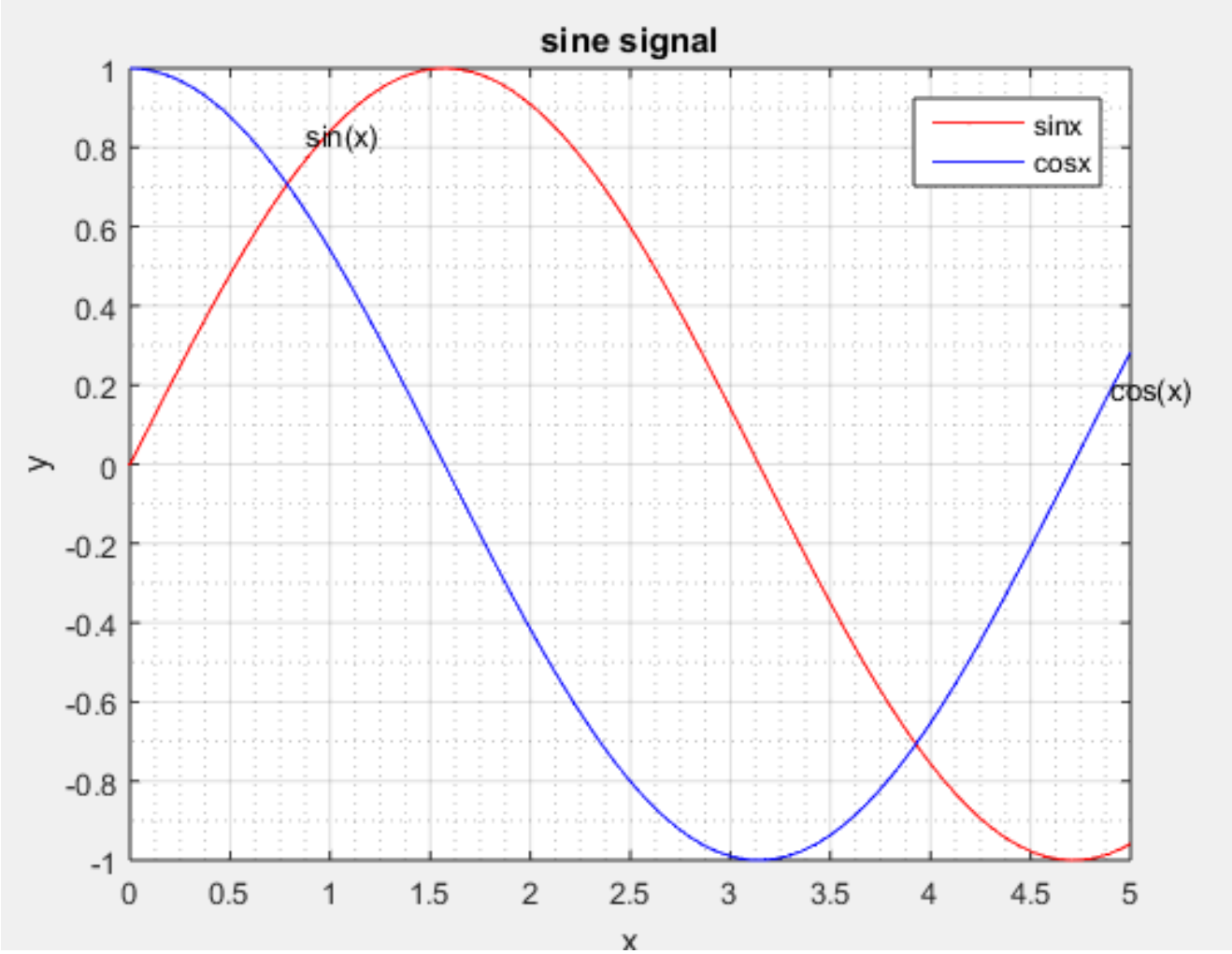
16.view(T) sets the view according to the transformation matrix T, which is a 4-by4 matrix such as a perspective transformation generated by viewmtx. [Not used]

17.[az,el] = view returns the current azimuth and elevation. [Not used]

18.T = view returns the current 4-by-4 transformation [Not used]

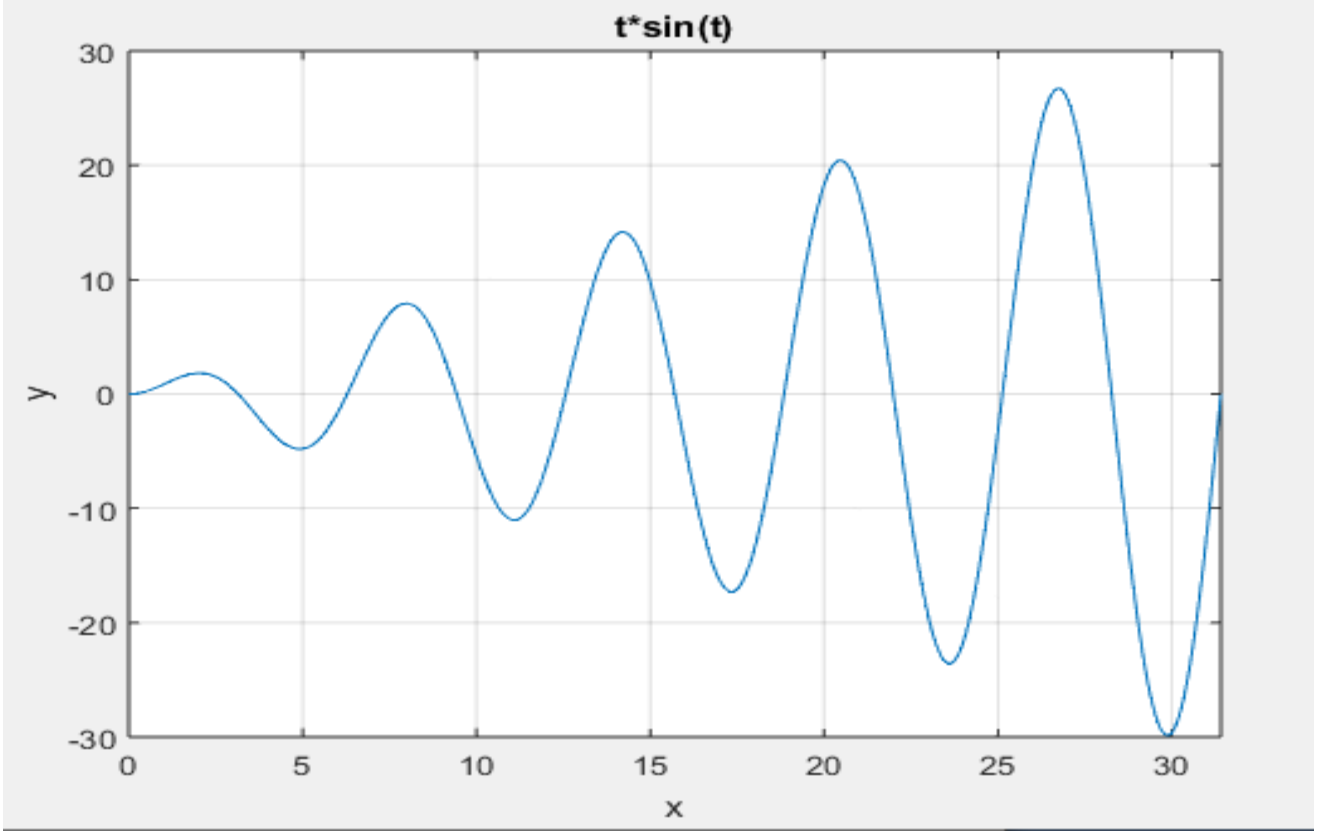
1

```
% (1) To plot sinx and cos x on a single figure using hold command
x=linspace(0,2*pi,100); % linspace generate linearly spaced vector
y=sin(x);
z=cos(x);
plot(x,y,'-r'); % to plot the 2-D graph
hold on; % To add new plots with retaining the curent plot
gtext('sin(x)');  % adding the text in the plot
plot(x,z,'b');
hold on;
gtext('cos(x)');
xlabel('x'); % labeling the x plot
ylabel('y'); % labeling the y plot
title('sine signal'); % giving the title to the graph
axis([0 5 -1 1]); % giving the range to the axis
legend('sinx','cosx'); % to add legends in the graph
grid on; % to display and hide the frid lines
grid minor;
set(gca,'gridlinestyle','-'); %set graphics object properties
```



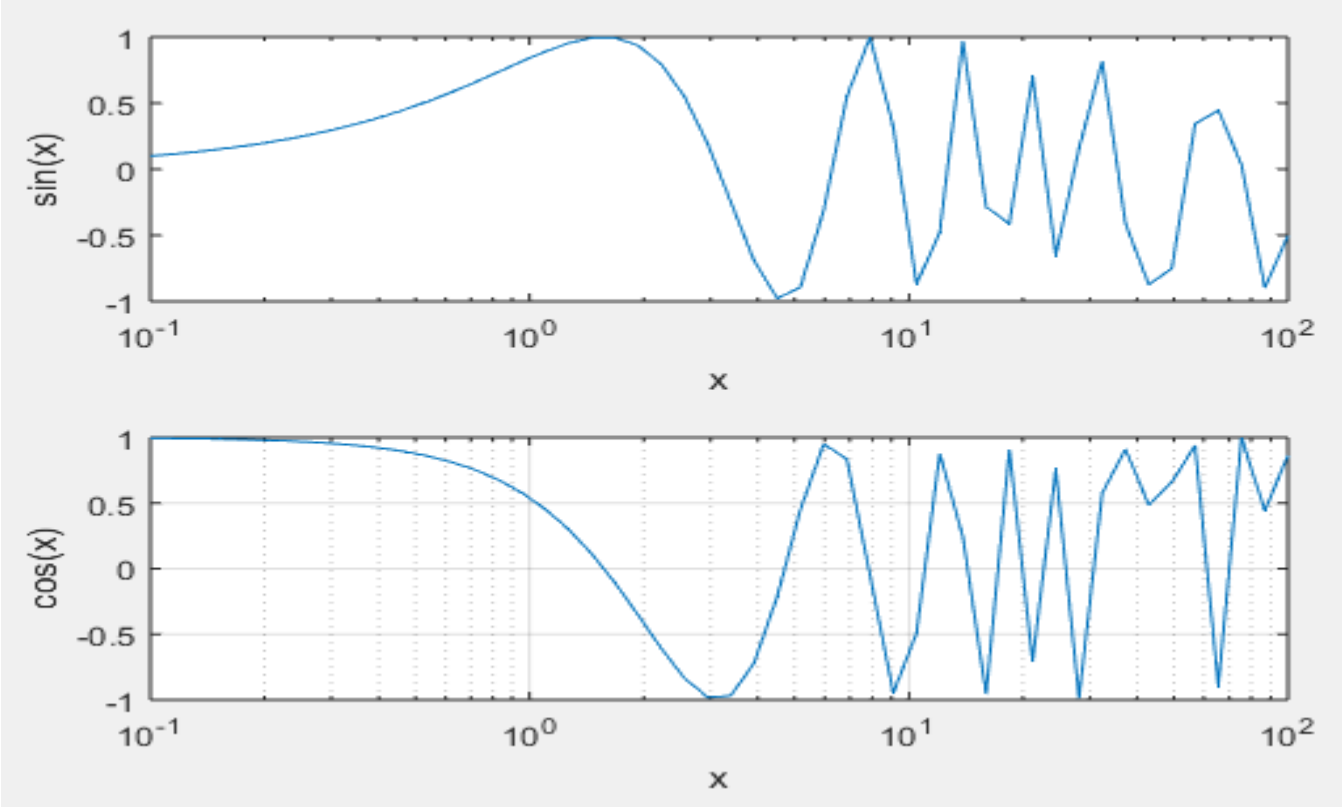
2.

```
%plot  f(t)=tsin(t), using fploy command.
syms t;
fplot('t*sin(t)',[0 10*pi]);
xlabel('x');
ylabel('y');
title('t*sin(t)');
grid on;
```



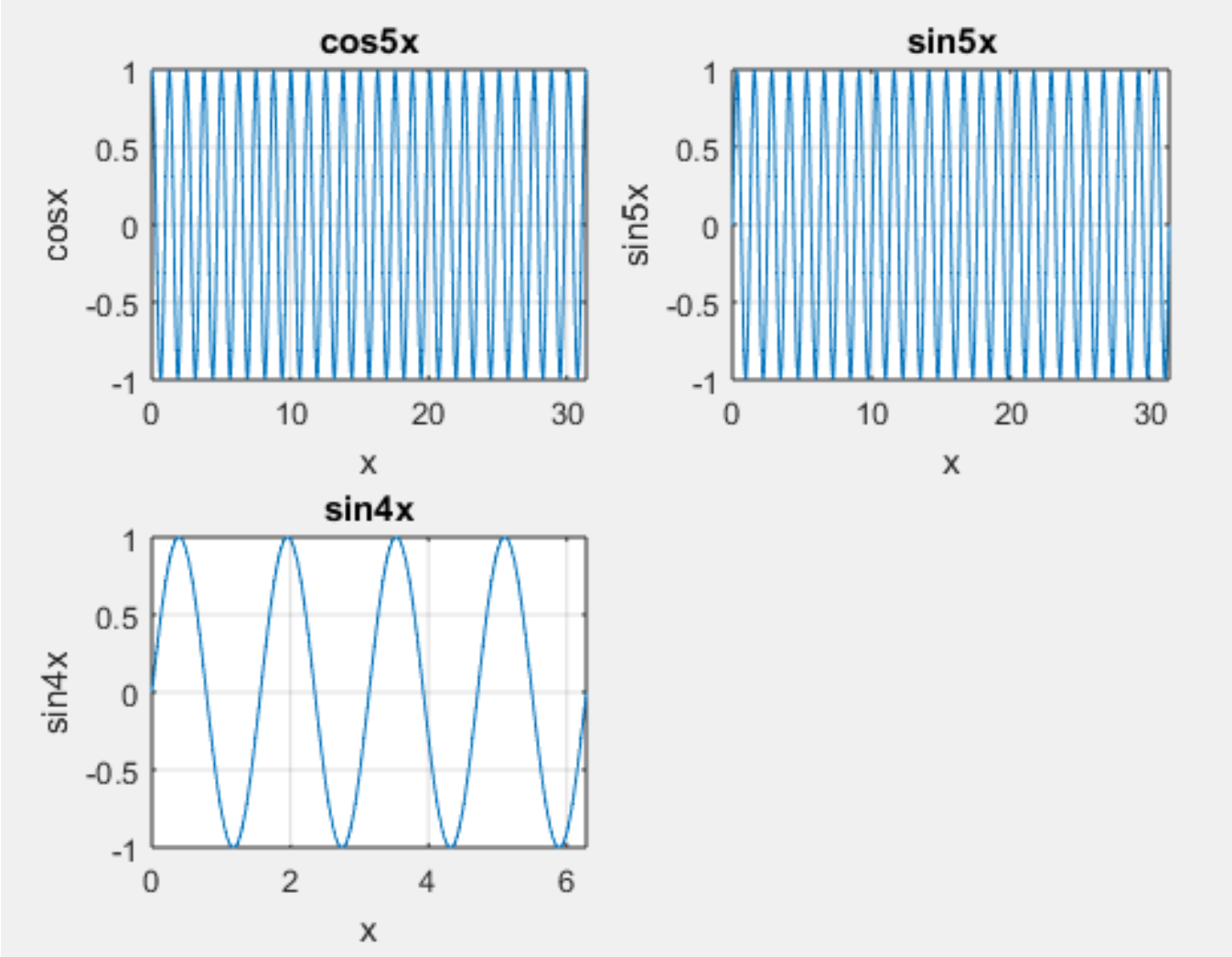

3.

```
% plot cos(x) and sin(x) on semilog scale.
x=logspace(-1,2);
y=sin(x);
subplot(2,1,1);
semilogx(x,y);
ylabel ('sin(x)');
xlabel('x');
x=logspace(-1,2);
y=cos(x);
subplot(2,1,2);
semilogx(x,y);
ylabel('cos(x)');
xlabel('x')
grid on;
```



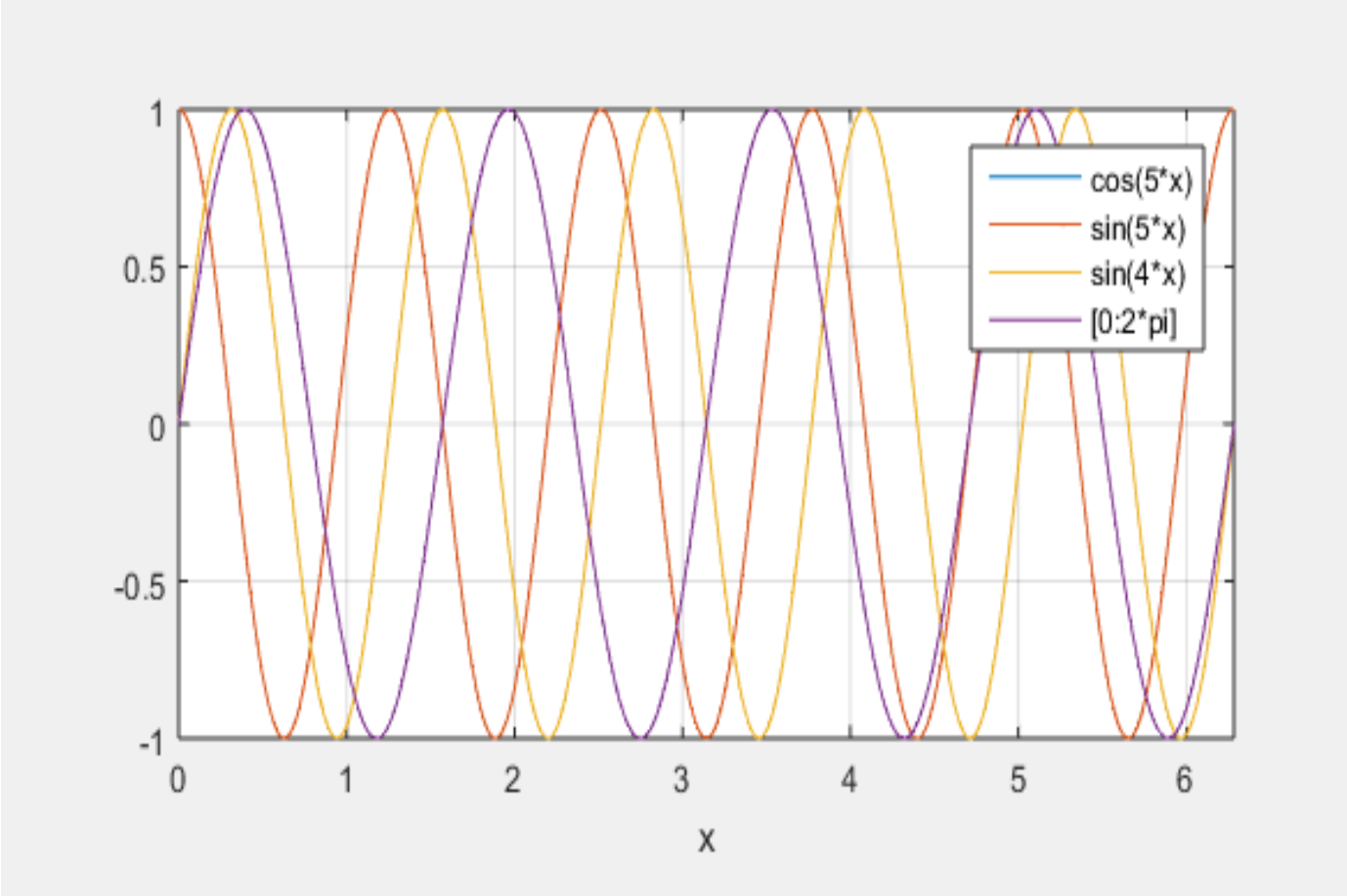

4.

```
%plot cos5x,sin5x,and sin4xon same plot.
syms x;
subplot(2,2,1);
fplot('cos(5*x)',[0 10*pi]);
xlabel('x');
ylabel('cosx')
title('cos5x');
grid on
subplot(2,2,2);
fplot('sin(5*x)',[0 10*pi]);
xlabel('x')
ylabel('sin5x')
title('sin5x');
grid on
subplot(2,2,3);
fplot('sin(4*x)',[0 2*pi]);
xlabel('x')
ylabel('sin4x')
title('sin4x');
grid on
```



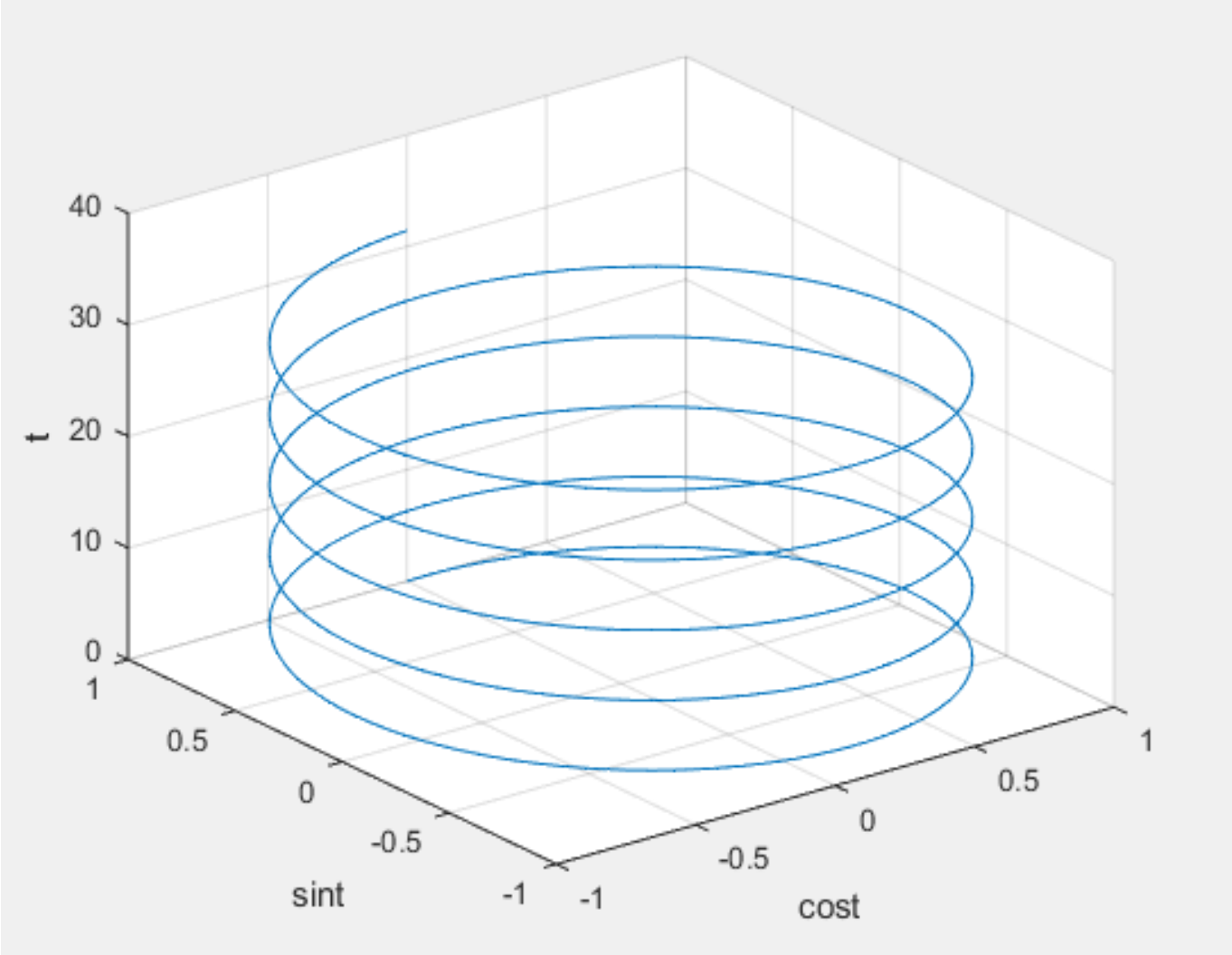

5.

```
% plot sint, cost using hold command
syms x;
fplot('cos(5*x)',[0 2*pi]);
grid on
hold on;
fplot('sin(5*x)',[0 2*pi]);
hold on;
subplot(2,2,3);
fplot('sin(4*x)',[0 2*pi]);
hold on;
legend ('cos(5*x)','sin(5*x)','sin(4*x)','[0:2*pi]');
xlabel('x')
```



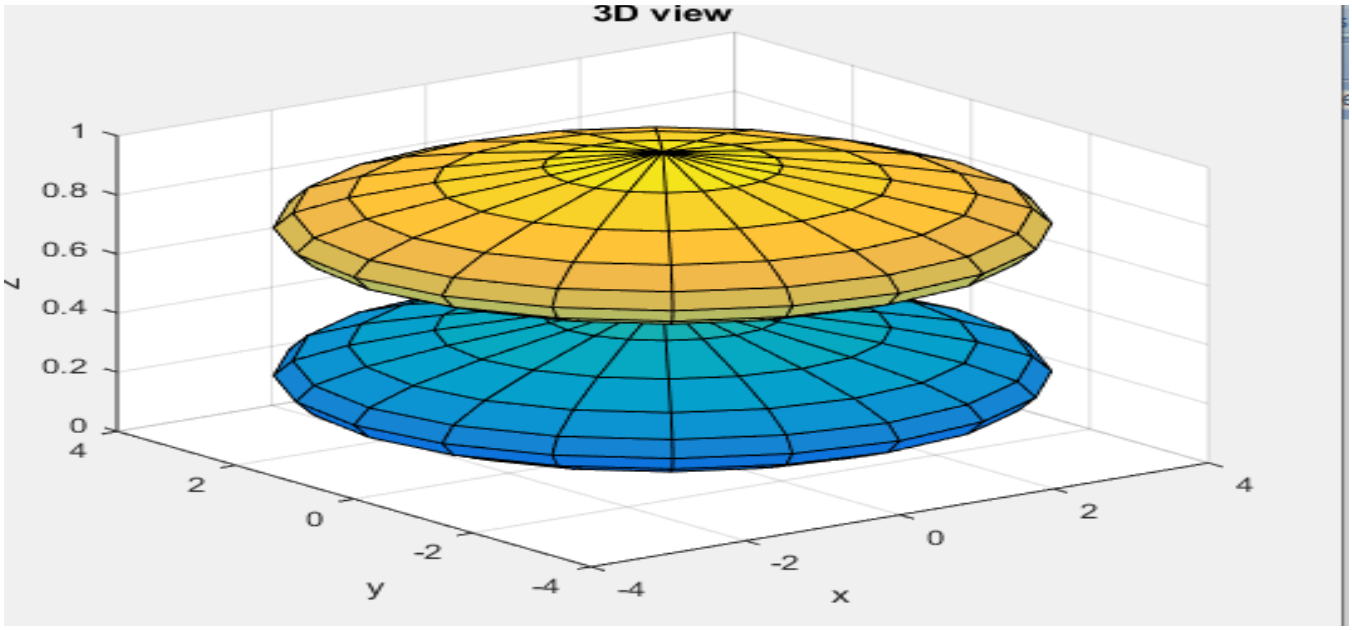

6.

```
%plot a3D function and use View(2) command and title them with 3D view.
t=0:pi/50:10*pi;
y=sin(t);
x=cos(t);
plot3(y,x,t);
xlabel('cost')
ylabel('sint');
zlabel('t');
grid on
```



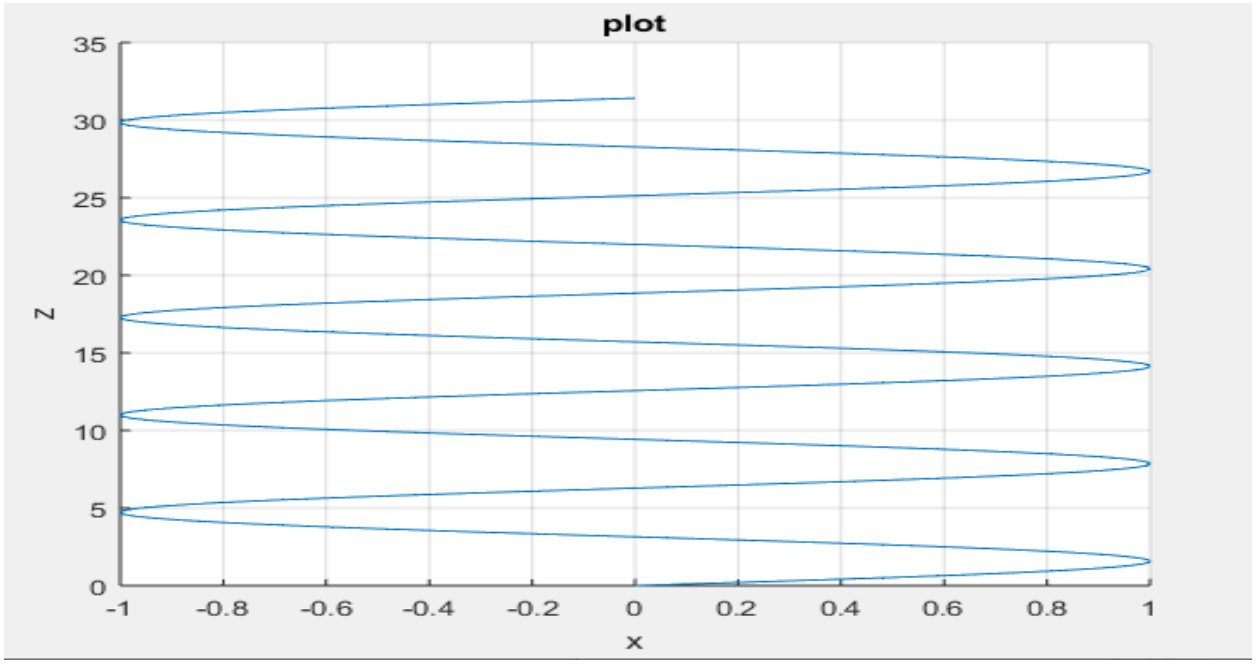

6b.

```
t=0:pi/10:2*pi;
r=4*sin(t);
[x,y,z]=cylinder(r);
surf(x,y,z);
xlabel('x');
ylabel('y');
zlabel('z');
title('3D view');
View(2);
```



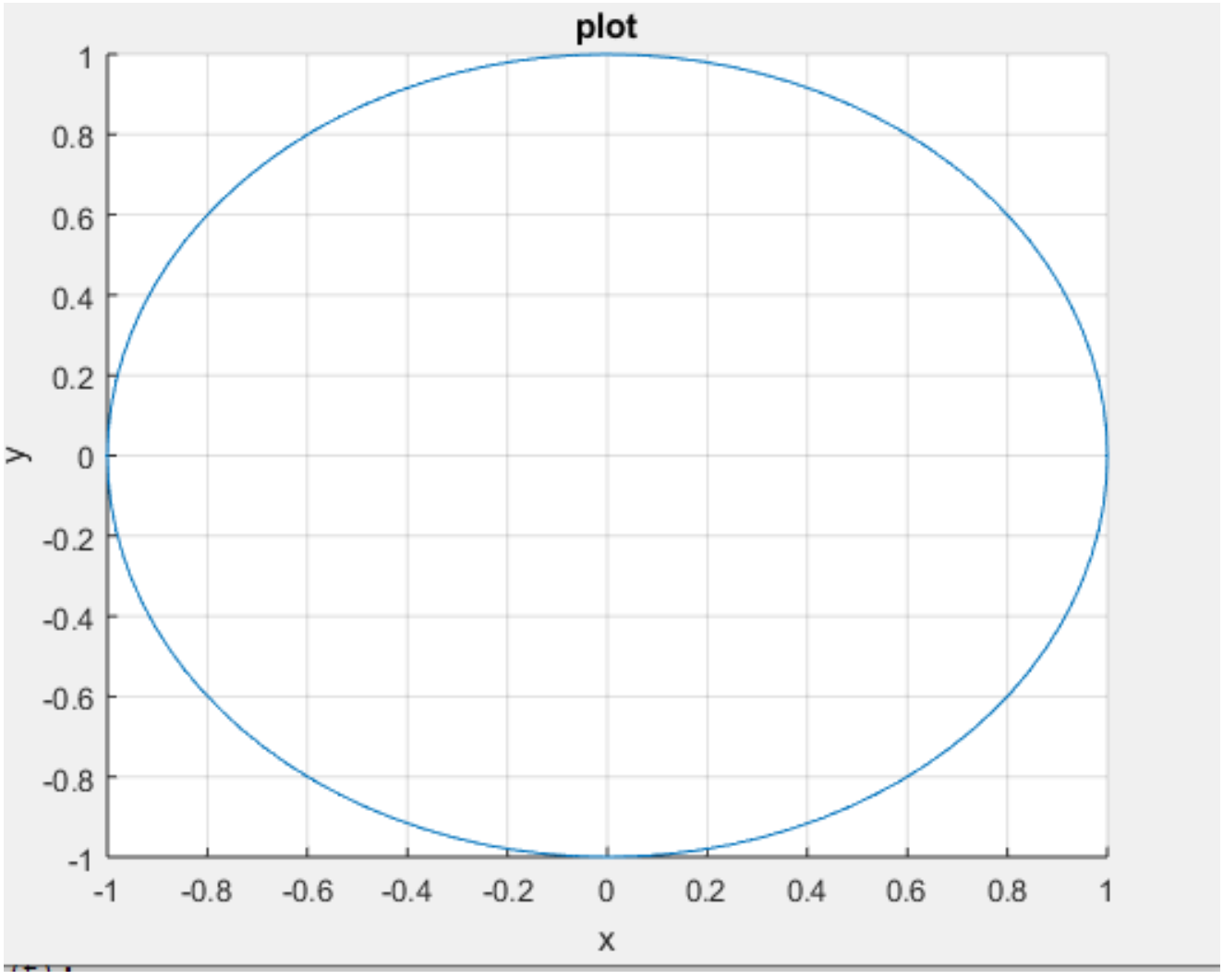

**7a**

```
% plot 3 command and view command for plot 3(x,y,z),x=cost,y=sint and z=t.
t=0:pi/50:10*pi;
y=sin(t);
x=cos(t);
plot3(y,x,t);
title('plot');
grid on;
xlabel('x');
ylabel('y');
zlabel('z')
view(0,0)
```



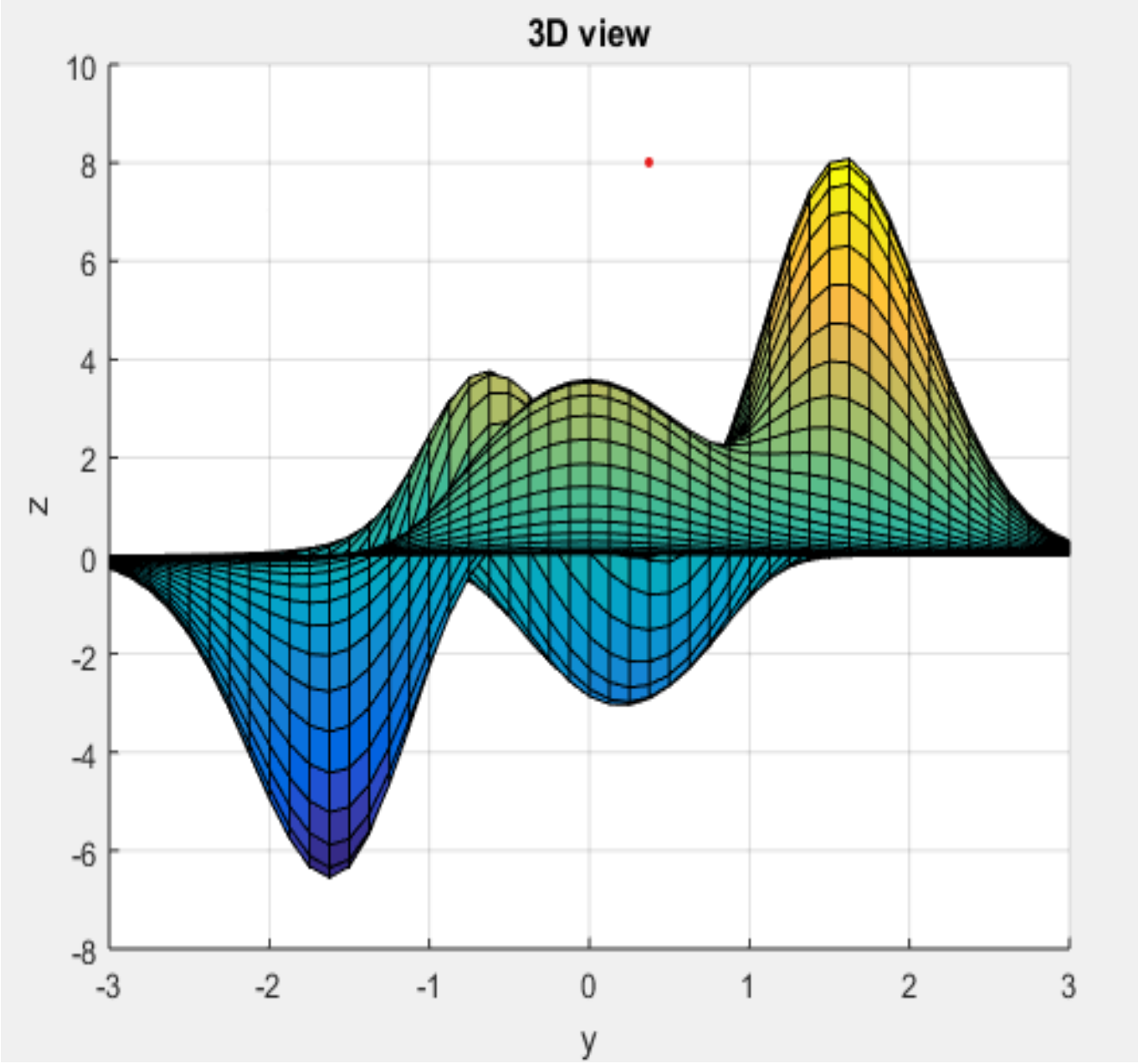
**7b.**

```
% plot 3 command and view command for plot 3(x,y,z),x=cost,y=sint and z=t.
t=0:pi/50:10*pi;
y=sin(t);
x=cos(t);
plot3(y,x,t);
title('plot');
grid on;
xlabel('x');
ylabel('y');
zlabel('z')
view(0,90)
```



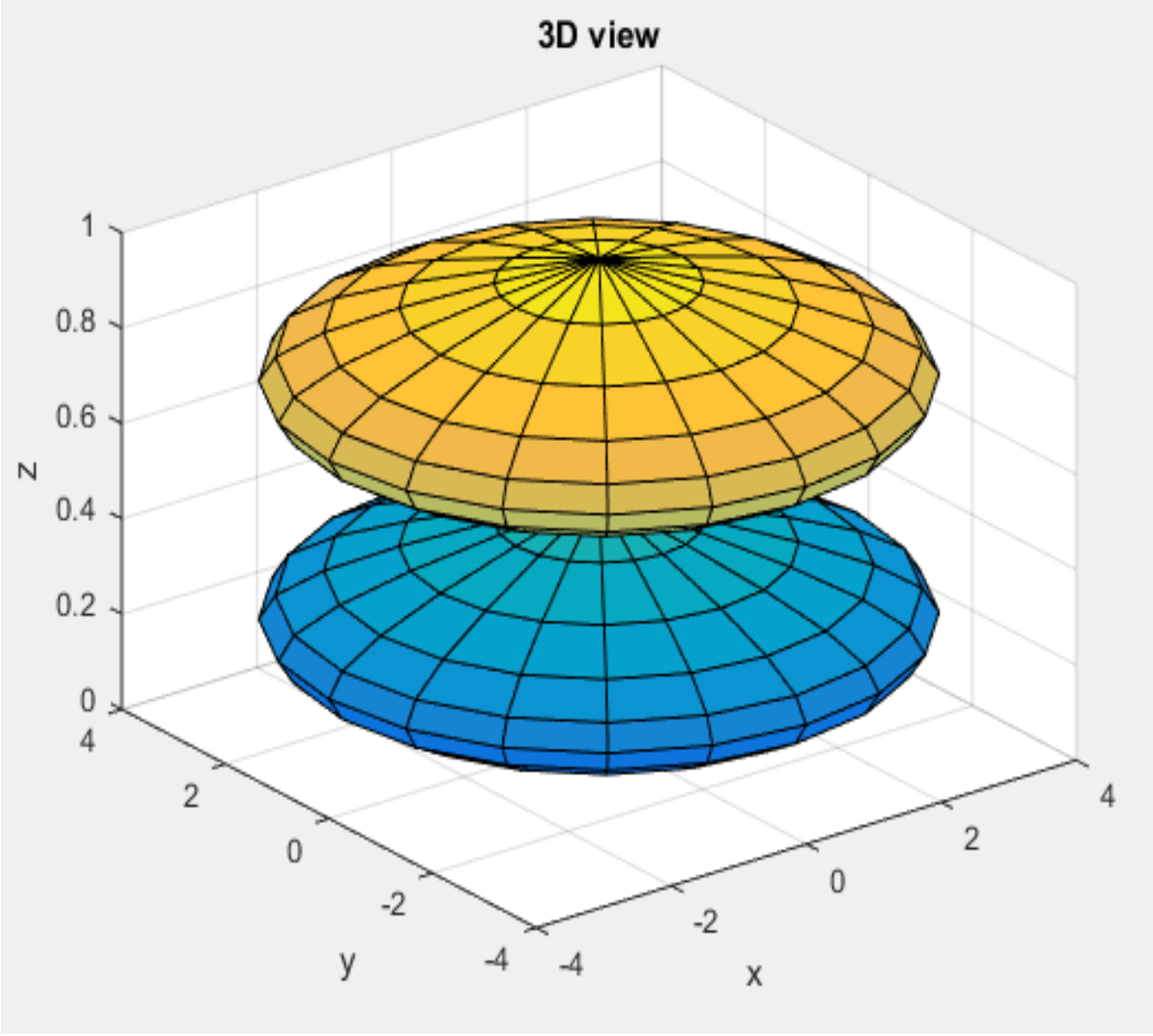
**7c.**

```
[x,y,z]=peaks;
surf(x,y,z);
xlabel('x');
ylabel('y');
zlabel('z');
title('3D view');
view(90,0)
```



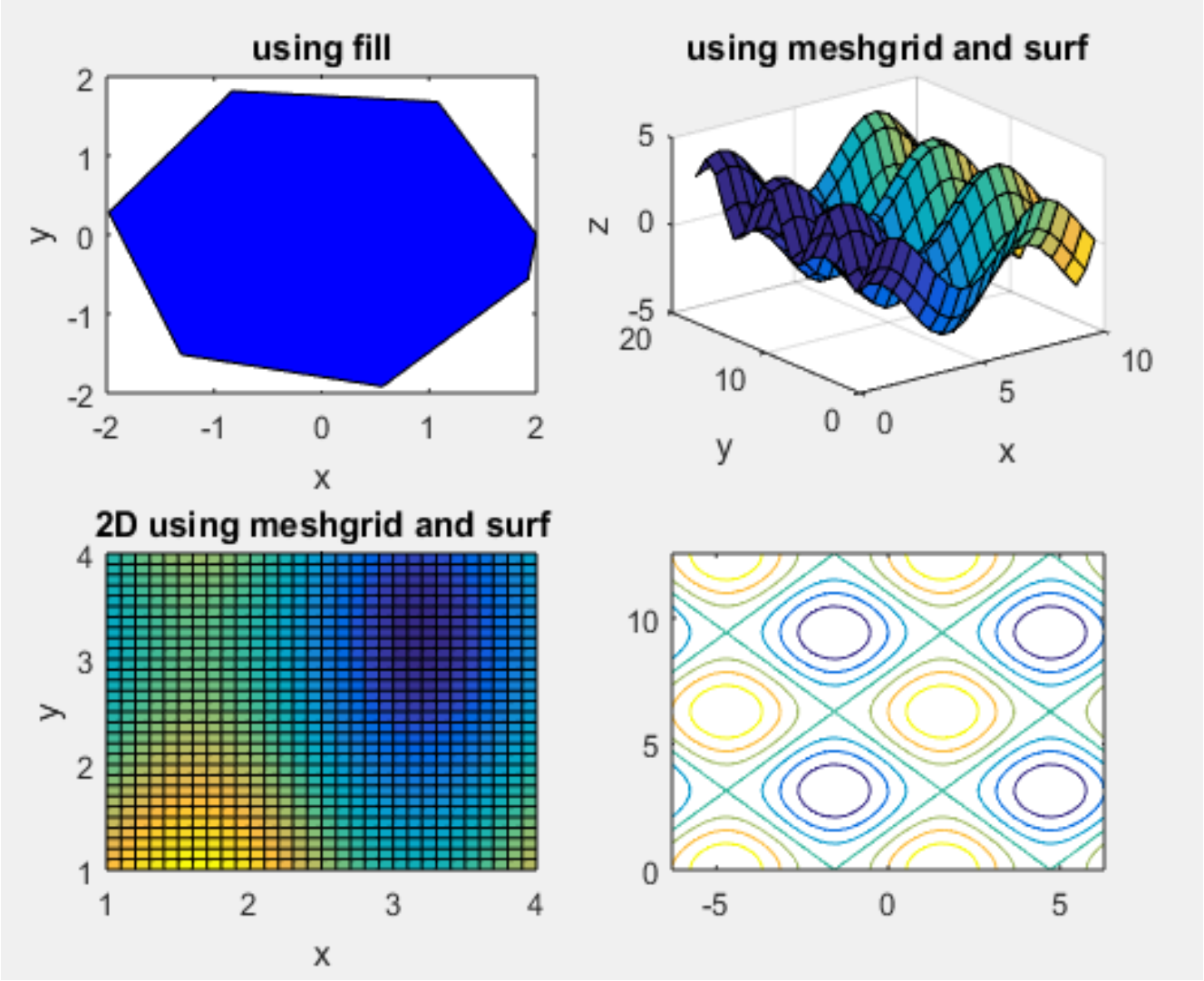
8.

```
%plot 3D function using view3command.
t=0:pi/10:2*pi;
r=4*sin(t);
[X,Y,Z]=cylinder(r);
surf(X,Y,Z);
xlabel('x');
ylabel('y');
zlabel('z');
title('3D view')
view(3);
grid on
```



9.

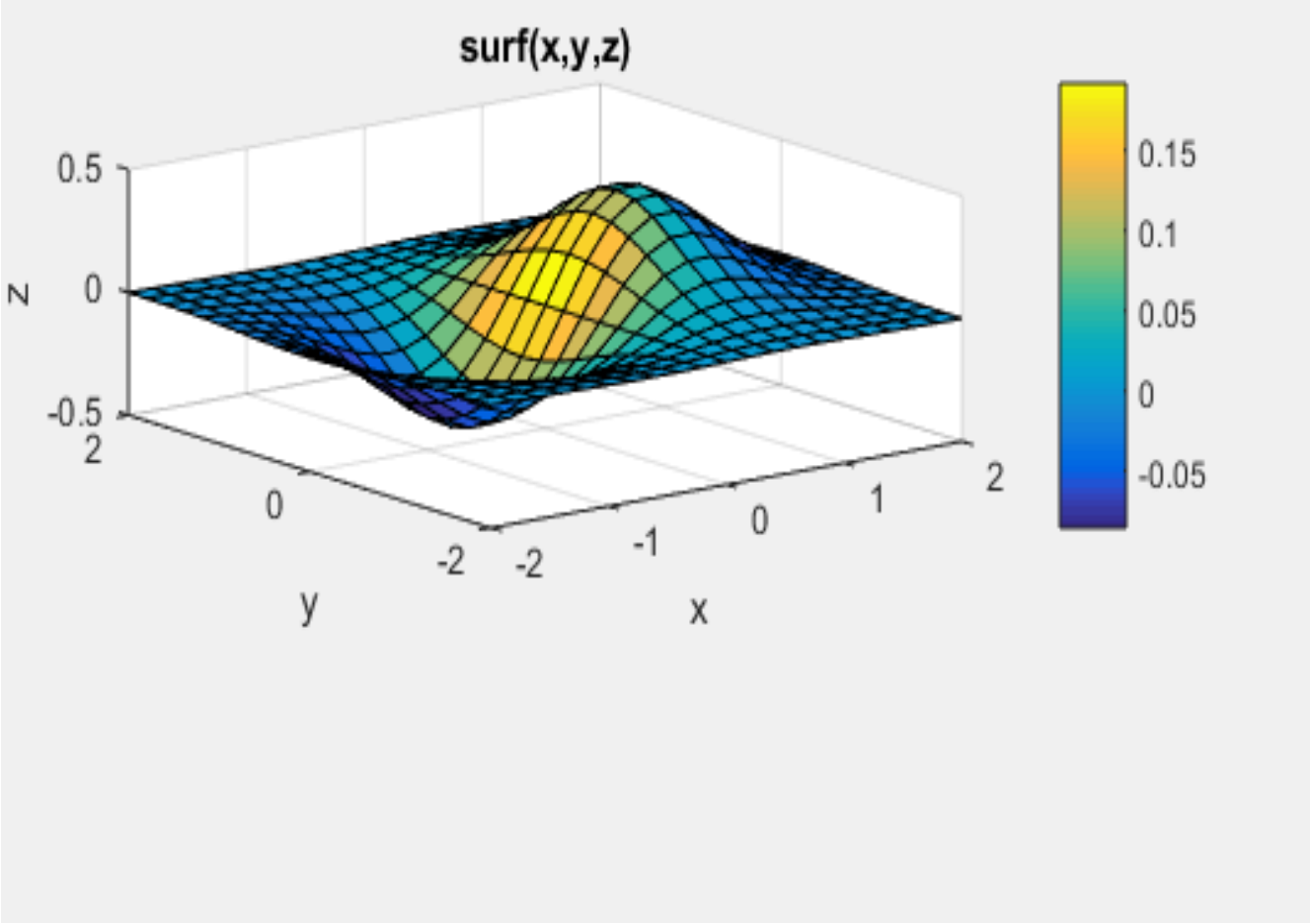
```
% to colour different shapes abd patterns on 2d and 3d image using
% fill,meshgrid,andcontour,surf command
% using fill
t=0:2*pi;
 x=2*cos(t);
 y=2*sin(t);
subplot(2,2,1);
 fill(x,y,'b')
xlabel('x');ylabel('y');
title('using fill')
%using  meshgrid and surf
 [X,Y]=meshgrid(1:0.5:10,1:20);
 Z=2*sin(X)+2*cos(Y);
 C=X.^2;
subplot(2,2,2);
 surf(X,Y,Z,C)
title('using meshgrid and surf')
xlabel('x');ylabel('y'); zlabel('z')
% 2D meshgrid and surf
 x=1:0.1:4;
 y=1:0.1:4;
 [X,Y]=meshgrid(x,y);
 Z=2*sin(X).^2+cos(Y);
subplot(2,2,3);
surf(X,Y,Z)
view(2)
title('2D using meshgrid and surf');
 grid on;
xlabel('x');ylabel('y');
%using contour
 x=linspace(-2*pi,2*pi);
 y=linspace(0,4*pi);
subplot(2,2,4);
 [X,Y]=meshgrid(x,y);
 Z=sin(X)+cos(Y);
 contour(X,Y,Z)
```




10

```
%to plot image for y=xexp(-x^2-y^2) using meshgrid and surf(x,y,z) and
%surf(z) commands

[x,y]=meshgrid(-2:0.2:2);
Z=x.*exp(-x.^2-y.^2);
subplot(2,1,1);
surf(Z);
title('surf(Z)');
colorbar;
xlabel('x');ylabel('y');zlabel('z');
% surf(x,y,z)
surf(x,y,Z,gradient(Z));
title('surf(x,y,z)');
colorbar;
xlabel('x');ylabel('y');zlabel('z');
```


surf(x,y,z)
0.5
0
-0.5
z
2
0
-2
y
-2
-1
0
1
2
x
0.15
0.1
0.05
0
-0.05