繪圖軟體應用 第8周(10/30)

1)上周複習

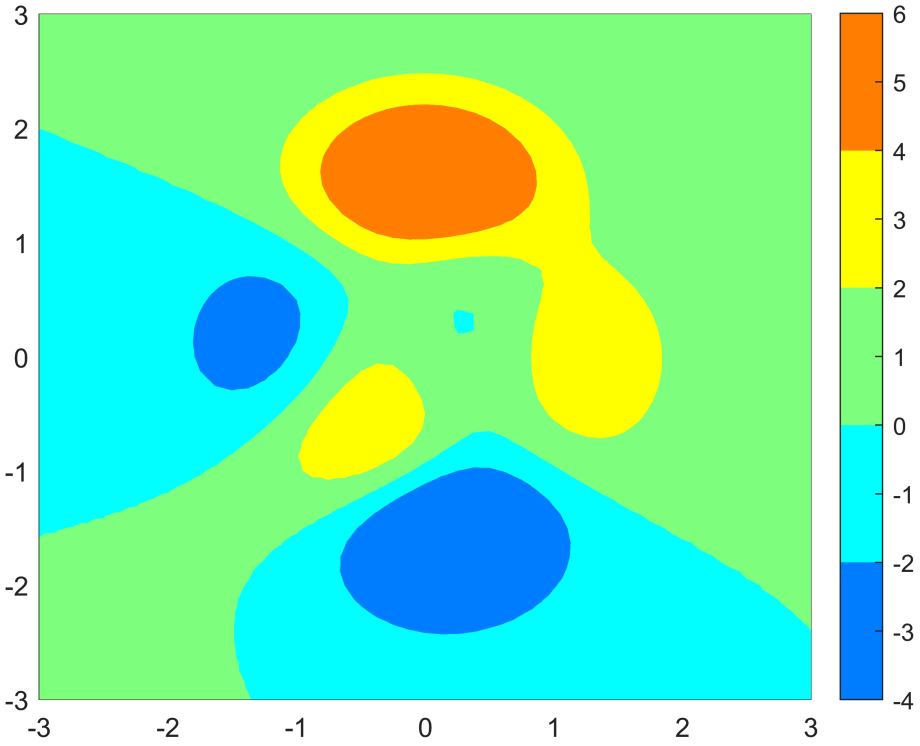
```
clear;clc;clf
[x,y,z] = peaks
```

```
x = 49×49
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250 ···
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
      ⋮

y = 49×49
   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000 ···
   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750
   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500
   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250
   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000
   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750
   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500
   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250
   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000
   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750
      ⋮

z = 49×49
    0.0001    0.0001    0.0002    0.0004    0.0007    0.0011    0.0017    0.0025 ···
    0.0001    0.0002    0.0004    0.0006    0.0010    0.0017    0.0026    0.0037
    0.0002    0.0003    0.0005    0.0009    0.0016    0.0025    0.0038    0.0055
    0.0002    0.0004    0.0008    0.0014    0.0023    0.0036    0.0055    0.0079
    0.0003    0.0006    0.0011    0.0019    0.0032    0.0051    0.0077    0.0110
    0.0004    0.0008    0.0015    0.0026    0.0044    0.0070    0.0106    0.0151
    0.0005    0.0010    0.0019    0.0034    0.0058    0.0093    0.0141    0.0203
    0.0007    0.0013    0.0024    0.0043    0.0073    0.0118    0.0182    0.0266
    0.0007    0.0015    0.0028    0.0051    0.0088    0.0145    0.0227    0.0337
    0.0008    0.0015    0.0030    0.0056    0.0100    0.0168    0.0270    0.0410
      ⋮
```

```
figure(1)
pcolor(x,y,z)
shading interp  % 做線性內插 (減少色階差異)
colorbar('v')
m = colormap('jet') %三個column代表RGB
```

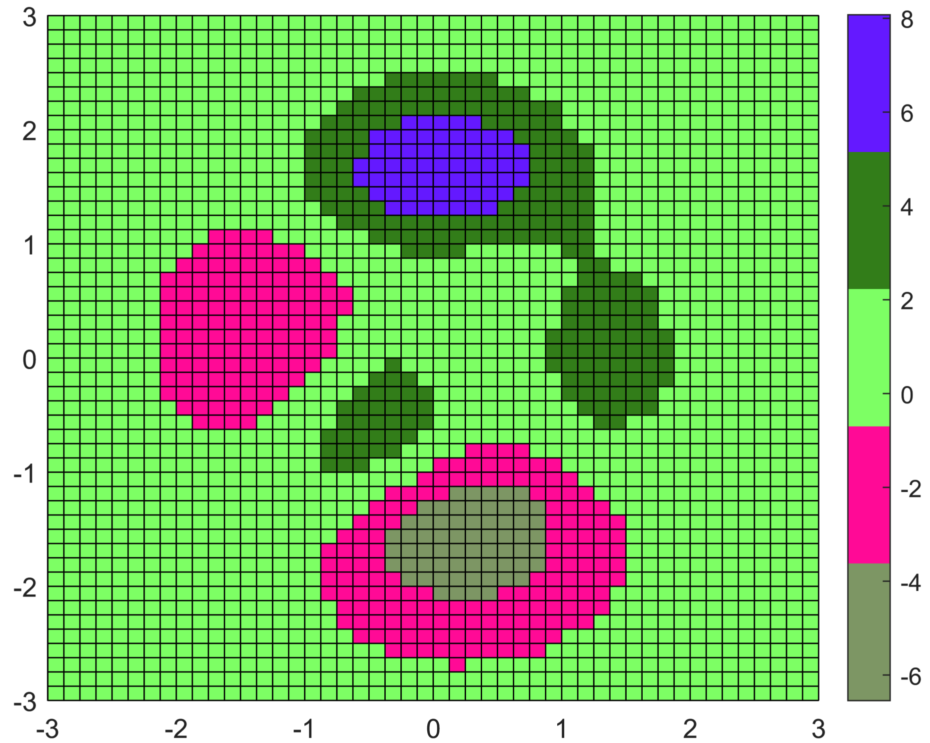
```
m = 5×3
         0    0.5000    1.0000
         0    1.0000    1.0000
    0.5000    1.0000    0.5000
    1.0000    1.0000         0
    1.0000    0.5000         0
```

```
caxis([-4 6])
```



自己調配colormap

```
figure(2)
pcolor(x,y,z)
% shading interp  % 做線性內插（減少色階差異）
colorbar('v')
load tryc.txt %載入自己的資料變數，值為0到1之間的5*3陣列
colormap(tryc)
```



2) 等值線圖

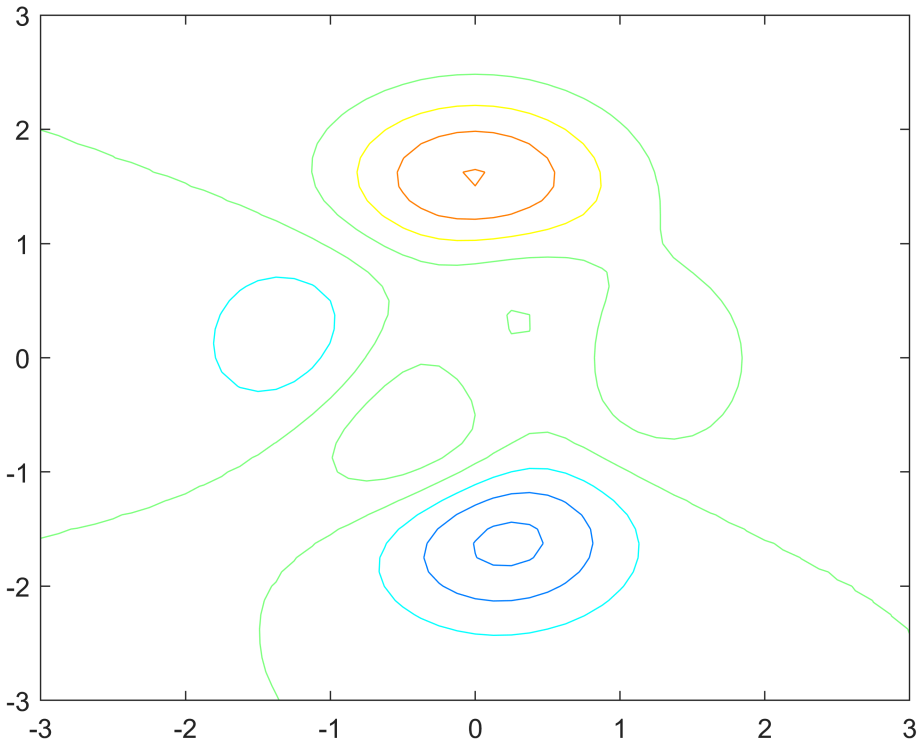
```
clear;clc;clf
[x2,y2,z2] = peaks
```

```
x2 = 49×49
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250 ···
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
   -3.0000   -2.8750   -2.7500   -2.6250   -2.5000   -2.3750   -2.2500   -2.1250
      ⋮
```

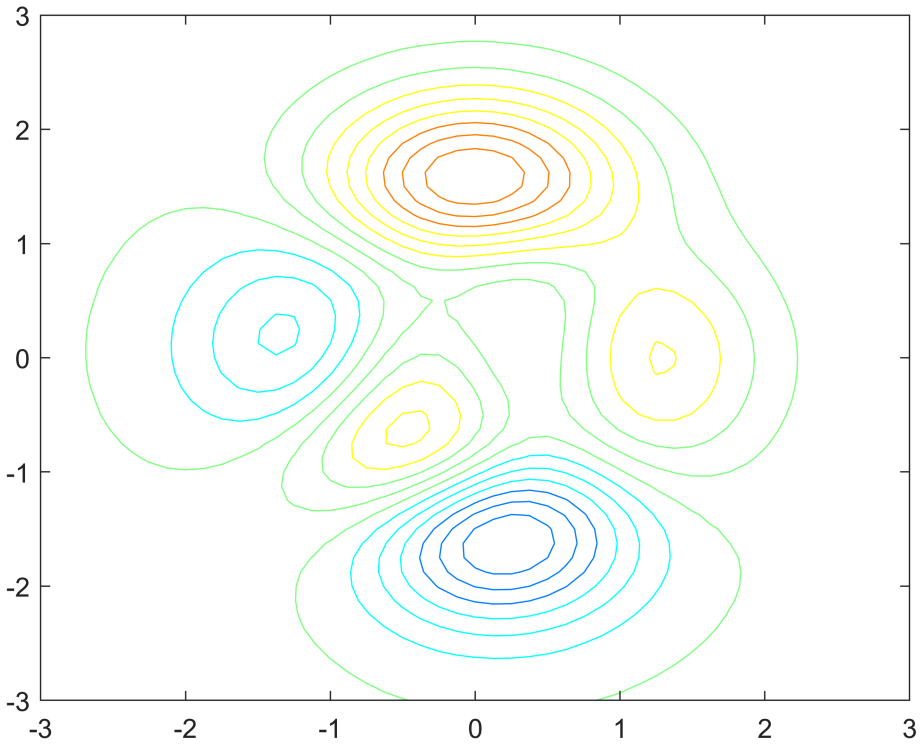
```
y2 = 49×49
   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000   -3.0000 ···
   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750   -2.8750
   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500   -2.7500
   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250   -2.6250
   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000   -2.5000
   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750   -2.3750
   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500   -2.2500
   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250   -2.1250
   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000   -2.0000
   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750   -1.8750
      ⋮
```

```
z2 = 49×49
    0.0001    0.0001    0.0002    0.0004    0.0007    0.0011    0.0017    0.0025 ···
    0.0001    0.0002    0.0004    0.0006    0.0010    0.0017    0.0026    0.0037
    0.0002    0.0003    0.0005    0.0009    0.0016    0.0025    0.0038    0.0055
    0.0002    0.0004    0.0008    0.0014    0.0023    0.0036    0.0055    0.0079
    0.0003    0.0006    0.0011    0.0019    0.0032    0.0051    0.0077    0.0110
    0.0004    0.0008    0.0015    0.0026    0.0044    0.0070    0.0106    0.0151
    0.0005    0.0010    0.0019    0.0034    0.0058    0.0093    0.0141    0.0203
    0.0007    0.0013    0.0024    0.0043    0.0073    0.0118    0.0182    0.0266
    0.0007    0.0015    0.0028    0.0051    0.0088    0.0145    0.0227    0.0337
    0.0008    0.0015    0.0030    0.0056    0.0100    0.0168    0.0270    0.0410
      ⋮
```

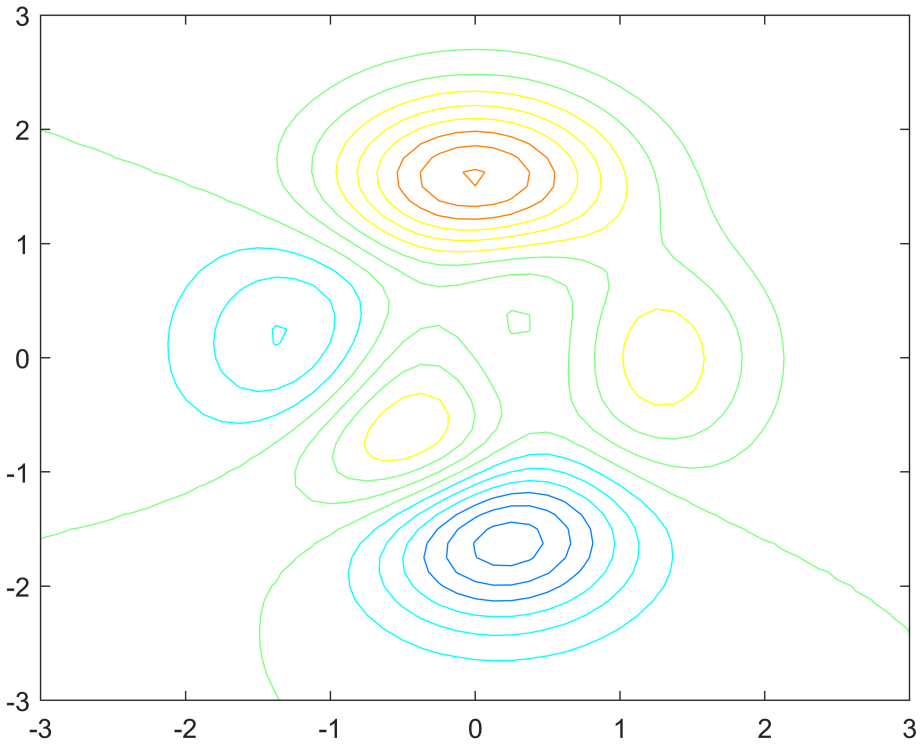
```
figure(1)
contour(x2,y2,z2)
colormap('jet')
```



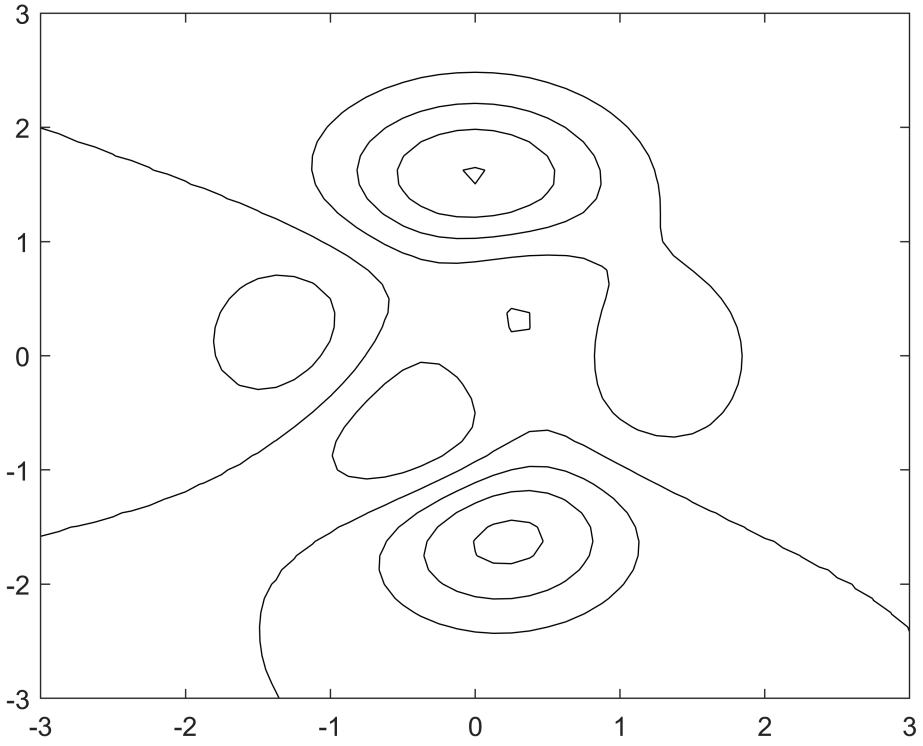

```
contour(x2,y2,z2,15) %contour(z,n) 畫n條等值線
```




```
contour(x2,y2,z2,[-6:1:8])% contour(x,y,z,v) 指定等值線的向量
```



```
                    % 指定從 -6 畫到 8 (間隔值1)
contour(x2,y2,z2,'k') %等值線特性
```

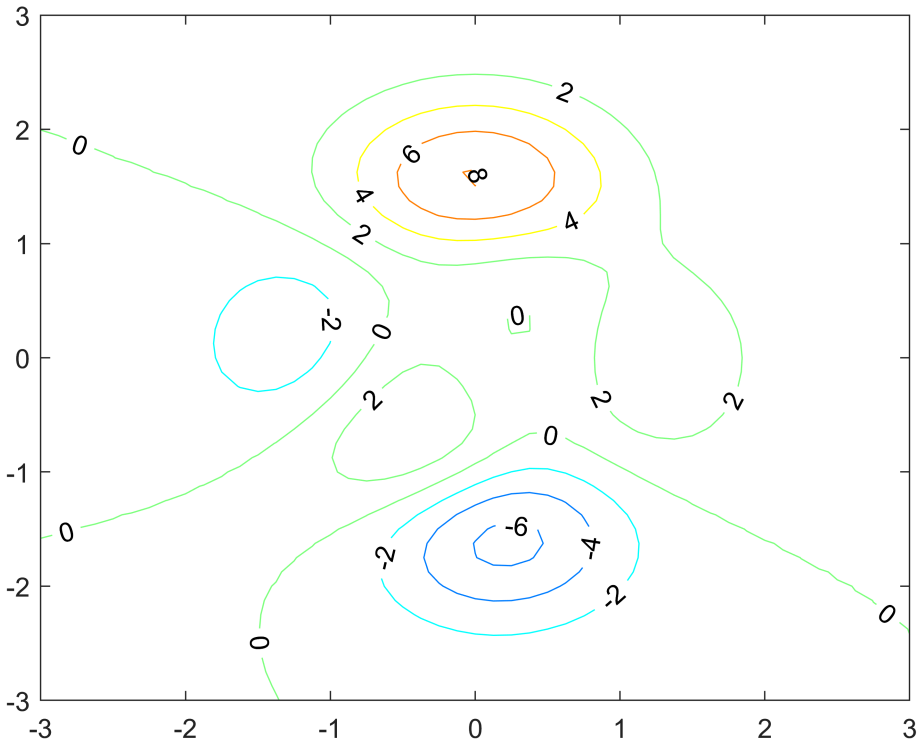


標示等值線的值

```
figure(2)
[c1,h1] = contour(x2,y2,z2)
```

```
c1 = 2×510
   -6.0000    0.4022    0.3750    0.2500    0.1250    0.0109         0   -0.0117 ···
   15.0000   -1.7500   -1.7717   -1.8204   -1.8153   -1.7500   -1.7110   -1.6250
h1 =
  Contour with properties:

    LineColor: 'flat'
    LineStyle: '-'
    LineWidth: 0.5000
         Fill: 'off'
    LevelList: [-6 -4 -2 0 2 4 6 8]
        XData: [49×49 double]
        YData: [49×49 double]
        ZData: [49×49 double]

  Show all properties
```

```
clabel(c1,h1)
```

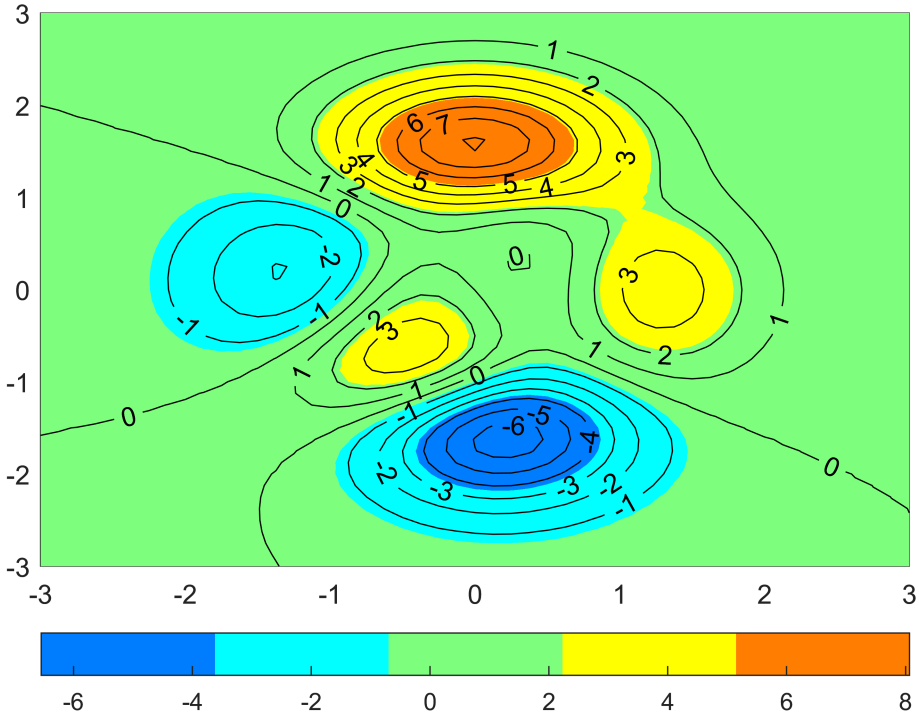


pcolor()

```
figure(3)
pcolor(x2,y2,z2)
shading interp
hold on
[c2,h2]=contour(x2,y2,z2,[-6:1:8],'k')
```

```
c2 = 2×1038
   -6.0000    0.4022    0.3750    0.2500    0.1250    0.0109         0   -0.0117 ···
   15.0000   -1.7500   -1.7717   -1.8204   -1.8153   -1.7500   -1.7110   -1.6250
h2 =
  Contour with properties:

    LineColor: [0 0 0]
    LineStyle: '-'
    LineWidth: 0.5000
         Fill: 'off'
    LevelList: [-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8]
        XData: [49×49 double]
        YData: [49×49 double]
        ZData: [49×49 double]

  Show all properties
```

```
clabel(c2,h2)
hold off
colorbar('h')
colormap('jet')
```



3) meshgrid( )

```
clear;clc;clf
figure(1)
vx = 2:4
```

```
vx = 1×3
     2     3     4
```

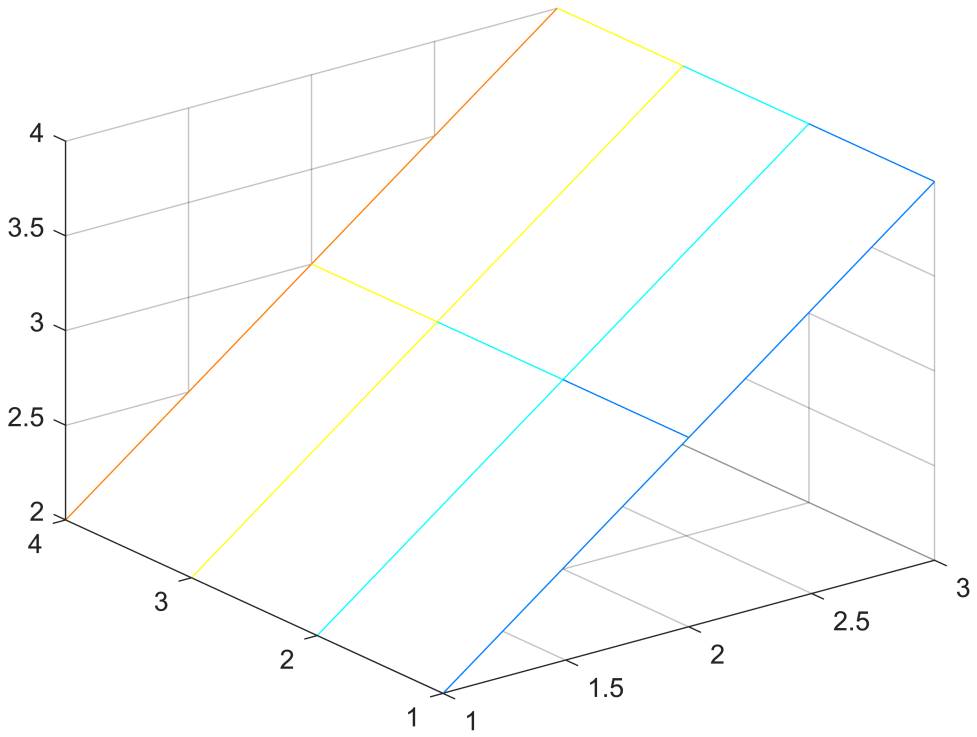
```
vy = 0:3
```

```
vy = 1×4
     0     1     2     3
```

```
[xx,yy] = meshgrid(vx,vy)
```

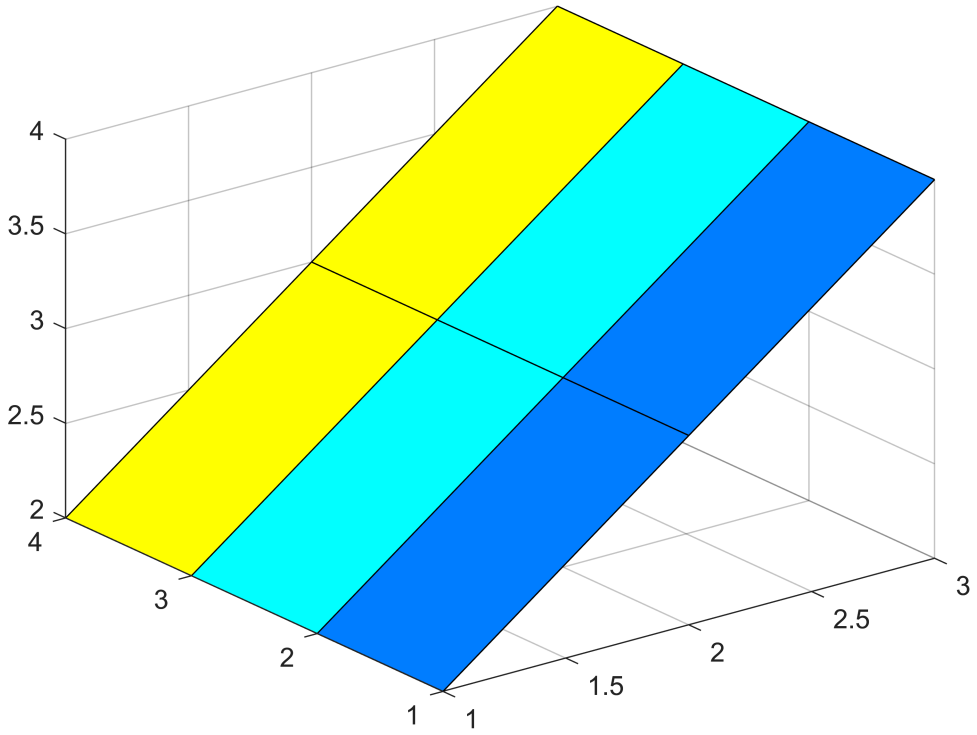
```
xx = 4×3
     2     3     4
     2     3     4
     2     3     4
     2     3     4
yy = 4×3
     0     0     0
     1     1     1
     2     2     2
     3     3     3
```

```
mesh(xx,yy)
```



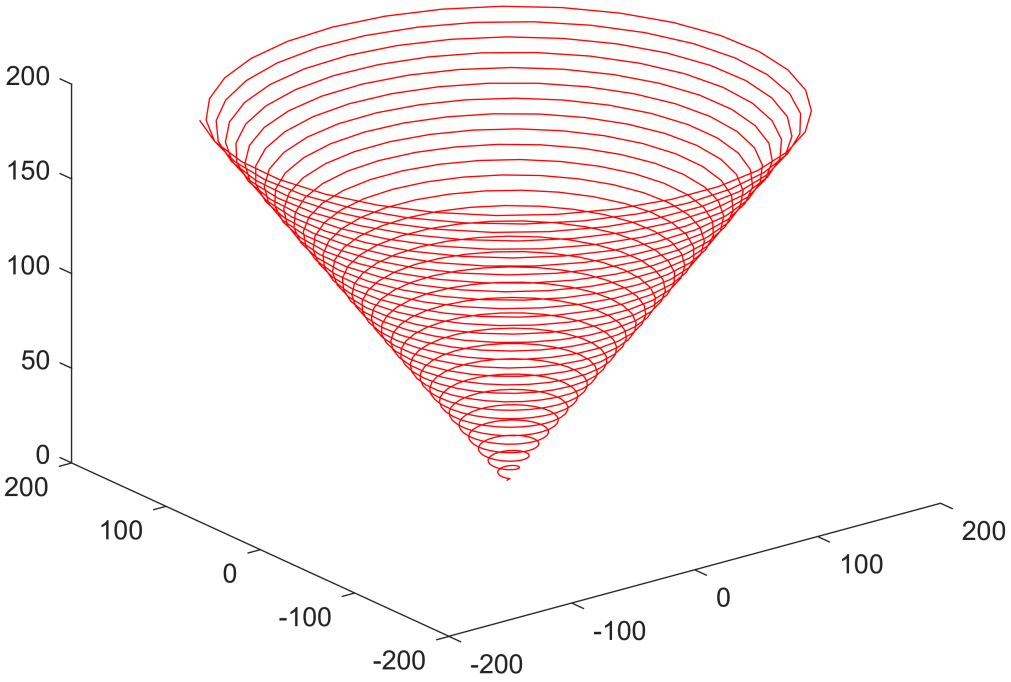
surf

```
figure(2)
surf(xx,yy)
```



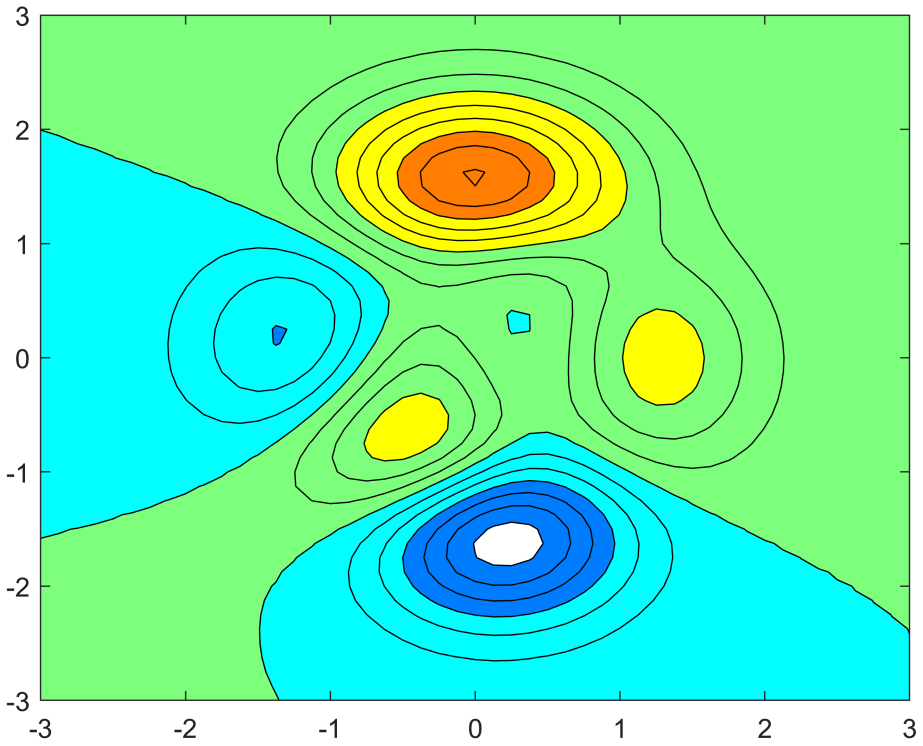
plot3()

```
figure(3)
t = linspace(1,200,1000);
plot3(t.*sin(t),t.*cos(t),t,'r')
```



contourf()：塗顏色填滿(fill)等高線的contour

```
clear;clc;clf
[x,y,z] = peaks;
[c,h] = contourf(x,y,z,[-6:1:8],'k');
```

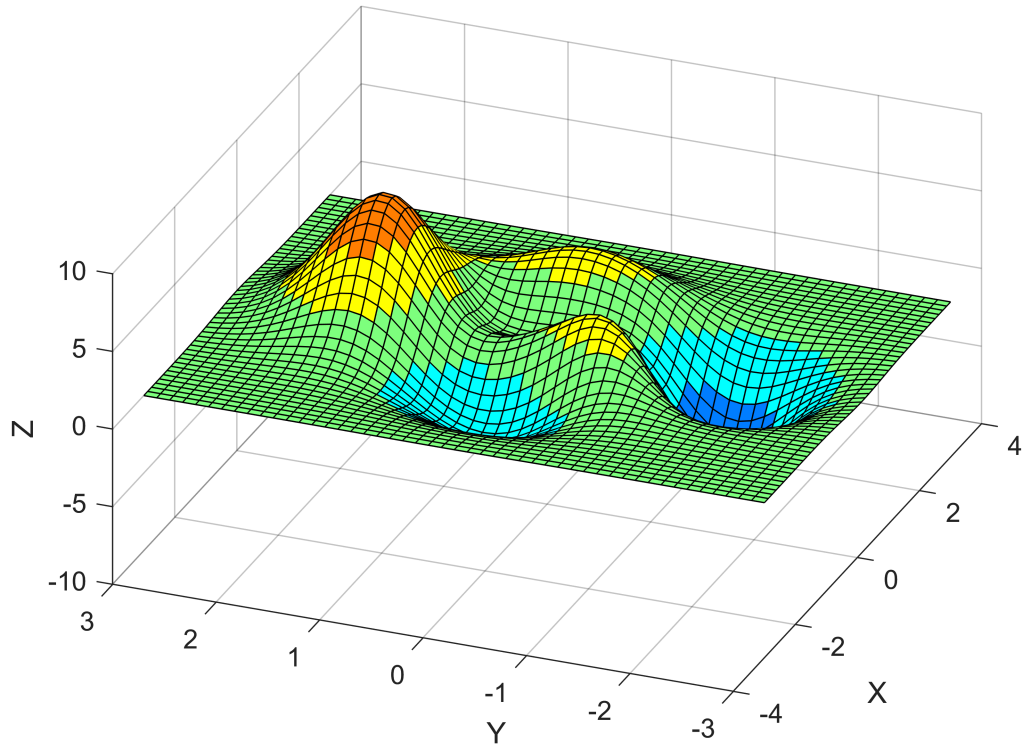



```
% clabel(c,h)
```

4) 三維繪圖視角

view

```
clear;clc;clf
[X,Y,Z] = peaks;
surf(X,Y,Z)
xlabel('X')
ylabel('Y')
zlabel('Z')
v = [-5 -2 5];
[caz,cel] = view(v)
```




```
caz = -68.1986
cel = 42.8760
```