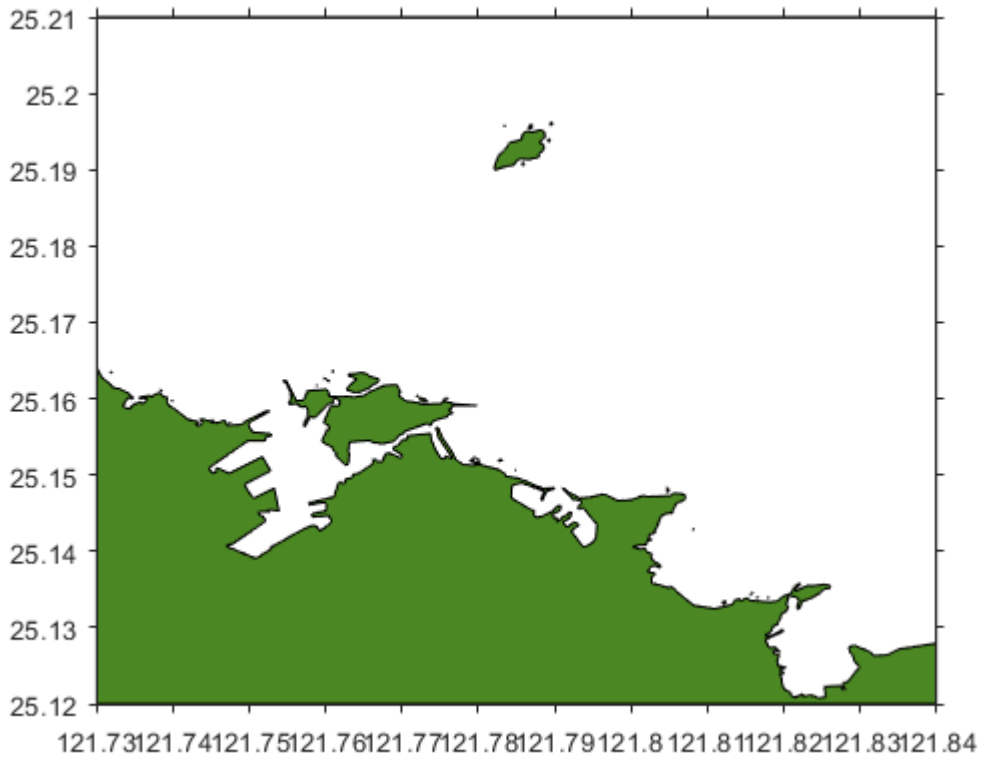
繪圖軟體應用 第7周(10/23)

```
dir plot_KL.m
```

```
plot_KL.m
```

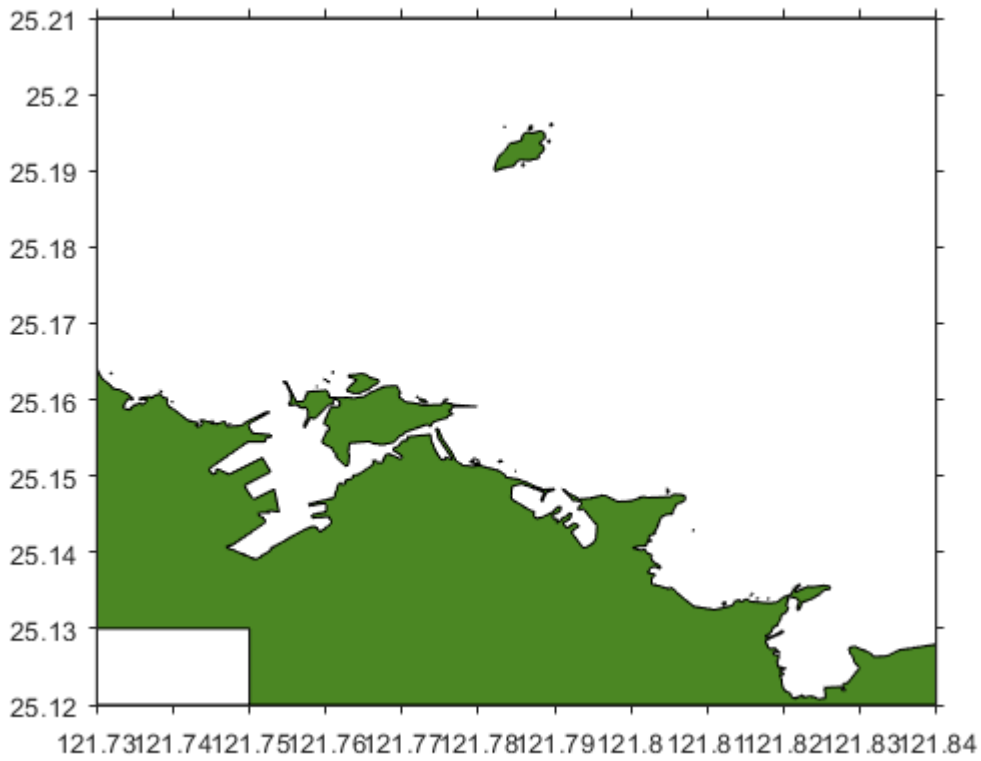
plot_KL.m

```
clear;clc;clf
for i=1:56
s=['land_data\land' int2str(i) '.dat'];
c=['land' int2str(i)];
load(s);    %載入檔案
cc=eval(c); %把字串轉成可執行的指令
            %Execute MATLAB expression in text
fill(cc(:,1),cc(:,2),[77/255 137/255 37/255]);hold on; % fill : 塗色
plot(cc(:,1),cc(:,2),'k');hold on;
clear
end
axis('image') %固定圖案的縮放(在縮放視窗時不會變形)
axis([121.73 121.84 25.12 25.21])

set(gca,'tickdir','out','xtick',[121.73:0.01:121.85],'ytick',[25.12:0.01:25.21])
plot([121.73 121.84 121.84 121.73 121.73],[25.12 25.12 25.21 25.21 25.12],'k')  %在figure外面畫
```



在圖上左下角放實心白框

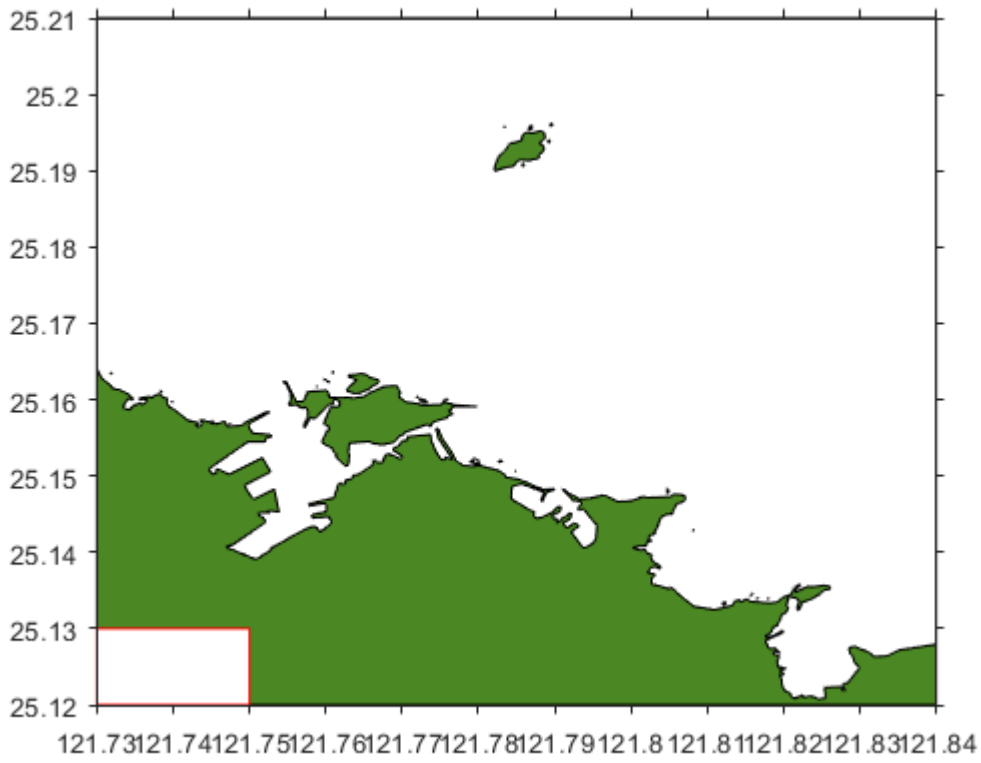
```
fill([121.73 121.75 121.75 121.73 121.73],[25.12 25.12 25.13 25.13 25.12],'w')
```




```
%       本壘     一壘  二壘     三壘     本壘     本壘     一壘  二壘     三壘  本壘     白色
```

在圖上左下角放空心紅框

```
plot([121.73 121.75 121.75 121.73 121.73],[25.12 25.12 25.13 25.13 25.12],'r')
```




```
%       本壘     一壘  二壘     三壘     本壘     本壘     一壘  二壘     三壘  本壘     紅色
```

1) 作業2-1

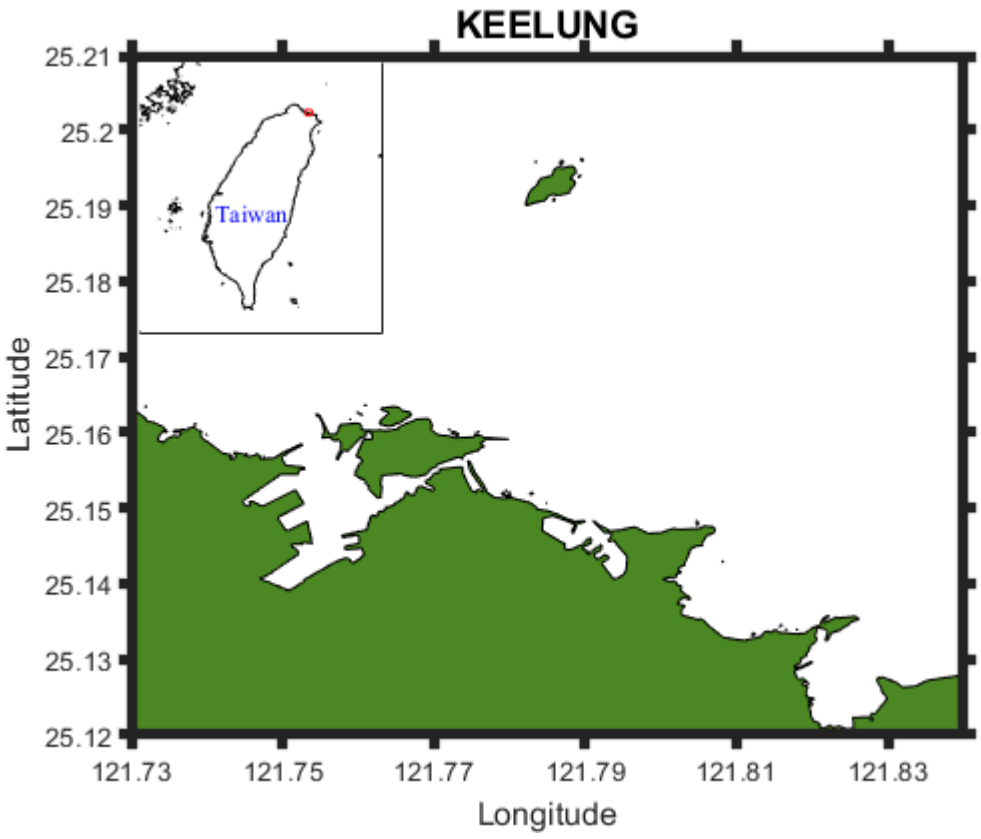
用基隆海岸圖，裡面畫圖中圖(台灣)，並用框框標示大圖範圍(基隆)

```
clear;clc;clf
for i=1:56
s=['land_data\land' int2str(i) '.dat'];
c=['land' int2str(i)];
load(s);    %載入檔案
cc=eval(c); %把字串轉成可執行的指令
            %Execute MATLAB expression in text
fill(cc(:,1),cc(:,2),[77/255 137/255 37/255]);hold on; % fill : 塗色
plot(cc(:,1),cc(:,2),'k');hold on;
clear
end
axis('image') %固定圖案的縮放
axis([121.73 121.84 25.12 25.21])

xlabel('Longitude',"FontSize",12,"FontName",'times')
ylabel('Latitude',"FontSize",12,"FontName",'times')
title('KEELUNG',"FontSize",14)

set(gca,'tickdir','out','xtick',[121.73:0.02:121.85],'ytick',[25.12:0.01:25.21])
set(gca,'LineWidth',4) %坐標軸設定粗細
plot([121.73 121.84 121.84 121.73 121.73],[25.12 25.12 25.21 25.21 25.12],'k')
```

```
%% 畫圖中圖
get(gca,'position') % 左 底部 寬度 高度
```

```
ans = 1×4
    0.1300    0.1120    0.7750    0.8130
```

```
axes('position',[0.062 0.5925 0.4 0.325])
hold on
load plot_KEELUNG.dat %載入檔案
lons = plot_KEELUNG(:,1); %取出經度
lats = plot_KEELUNG(:,2); %取出緯度
plot(lons,lats,'k')
% xlabel('Longitude',"FontSize",16,"FontName",'times')
% ylabel('Latitude',"FontSize",16,"FontName",'times')
% title()
axis('image') %讓圖形在縮放之後不會變形
axis([119 123 21.5 26])
text(120.25,23.5,'Taiwan','FontSize',9,'FontName','times','Color','b')%在圖中標示台灣
% set(gca,'LineWidth',4)%坐標軸設定粗細
set(gca,'XTick',[119:4:123],'YTick',[21.5:5.5:26],'yAxisLocation','right','xticklabels',{})
%改變 X 座標標示 119到123間隔4
%改變 Y 座標標示 21.5到26間隔5.5
set(gca,'xticklabels',{},'yticklabels',{})
plot([121.73 121.84 121.84 121.73 121.73],[25.12 25.12 25.21 25.21 25.12],'r')

%% 存圖
print('map_W71_00781035','-dpng')
```



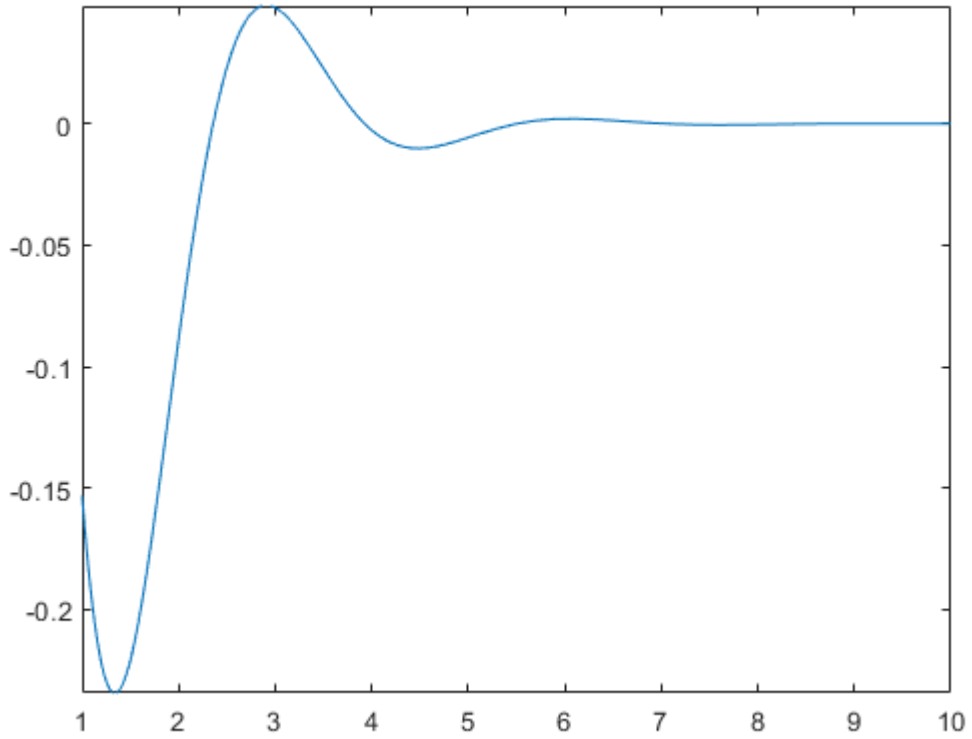
2) fplot

function plot : 直接匯出函數圖型

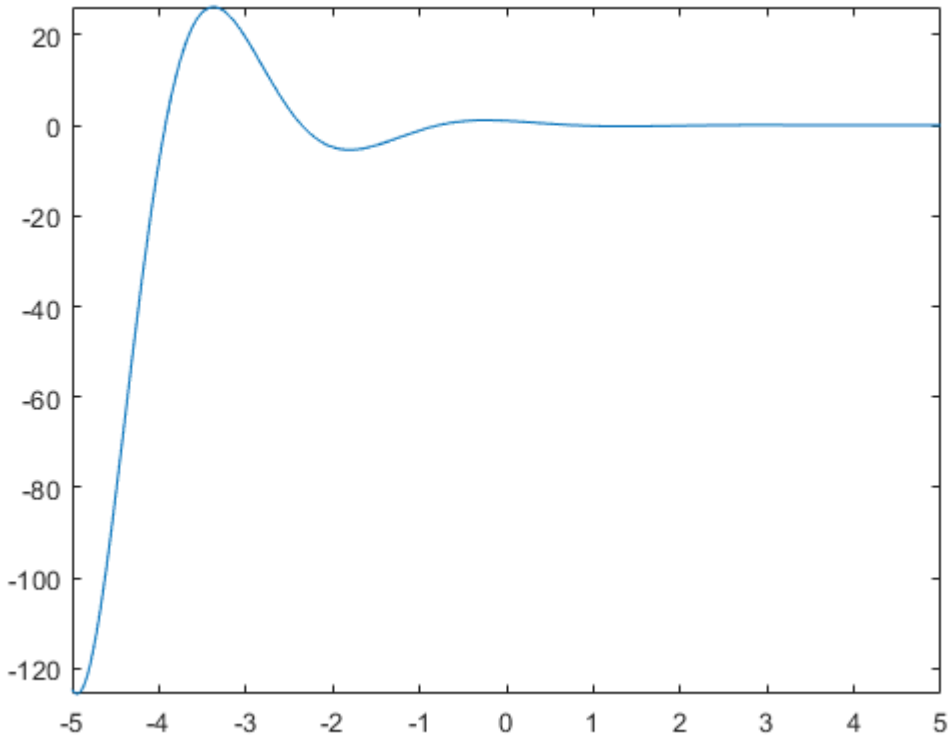
`fplot(f,xinterval)`

```
clear;clc;clf
fplot('cos(2*x)./exp(x)',[1,10])
```

```
Warning: fplot will not accept character vector or string inputs in a future release. Use
 fplot(@(x)cos(2.*x)./exp(x)) instead.
```

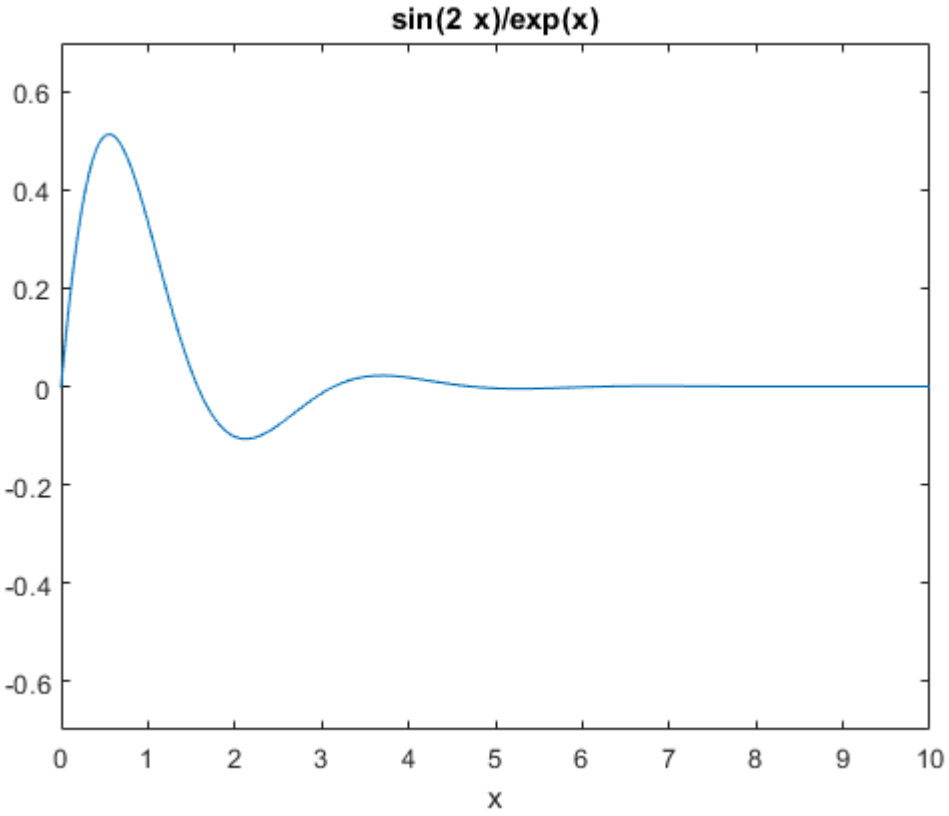



```
% fplot(@(x) exp(x),[-3 0],'b')
fplot(@(x)cos(2.*x)./exp(x))
```



3) ezplot

```
clear;clc;clf
ezplot('sin(2*x)/exp(x)',[0,10,-0.7,0.7])
```



4) 三維繪圖法

plot3

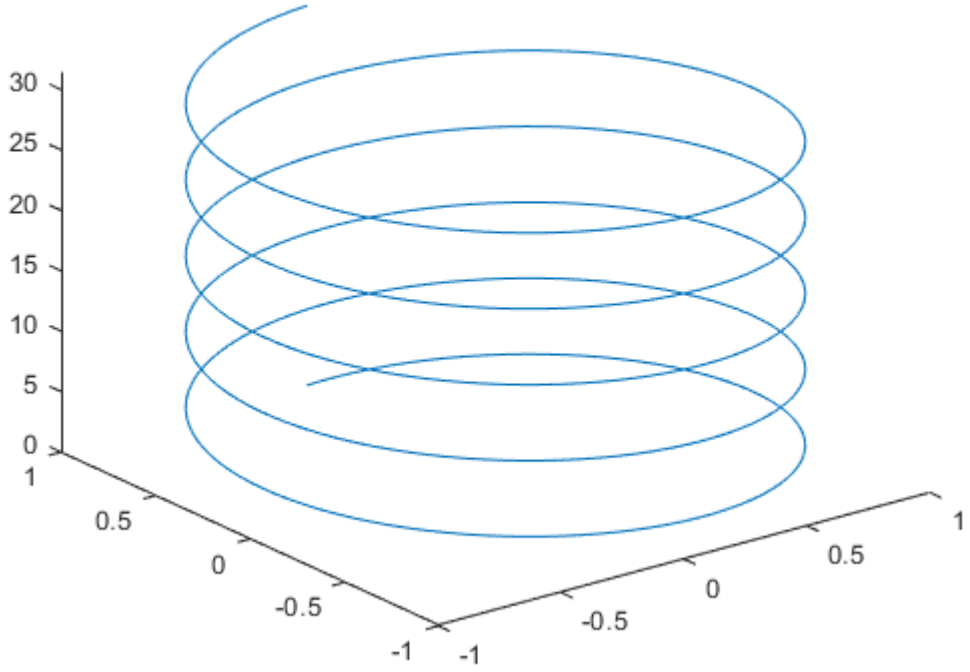
```
help graph3d
```

```
  Three dimensional graphs.

Elementary 3-D plots.
  plot3      - Plot lines and points in 3-D space.
  mesh       - 3-D mesh surface.
  surf       - 3-D colored surface.
  fill3      - Filled 3-D polygons.

Color control.
  colormap   - Color look-up table.
  caxis      - Pseudocolor axis scaling.
  shading    - Color shading mode.
  hidden     - Mesh hidden line removal mode.
  brighten   - Brighten or darken color map.
  colordef   - Set color defaults.
  graymon    - Set graphics defaults for gray-scale monitors.
  cmpermute  - Rearrange colors in colormap.
  cmunique   - Eliminate unneeded colors in colormap of indexed image.
  imapprox   - Approximate indexed image by one with fewer colors.

Lighting.
  surfl      - 3-D shaded surface with lighting.
  lighting   - Lighting mode.
  material   - Material reflectance mode.
  specular   - Specular reflectance.
  diffuse    - Diffuse reflectance.
```

```
  surfnorm   - Surface normals.

Color maps.
  parula     - Blue-green-orange-yellow color map
  hsv        - Hue-saturation-value color map.
  hot        - Black-red-yellow-white color map.
  gray       - Linear gray-scale color map.
  bone       - Gray-scale with tinge of blue color map.
  copper     - Linear copper-tone color map.
  pink       - Pastel shades of pink color map.
  white      - All white color map.
  flag       - Alternating red, white, blue, and black color map.
  lines      - Color map with the line colors.
  colorcube  - Enhanced color-cube color map.
  vga        - Windows colormap for 16 colors.
  jet        - Variant of HSV.
  prism      - Prism color map.
  cool       - Shades of cyan and magenta color map.
  autumn     - Shades of red and yellow color map.
  spring     - Shades of magenta and yellow color map.
  winter     - Shades of blue and green color map.
  summer     - Shades of green and yellow color map.

Transparency.
  alpha      - Transparency (alpha) mode.
  alphamap   - Transparency (alpha) look-up table.
  alim       - Transparency (alpha) scaling

Axis control.
  axis       - Control axis scaling and appearance.
  zoom       - Zoom in and out on a 2-D plot.
  grid       - Grid lines.
  box        - Axis box.
  hold       - Hold current graph.
  axes       - Create axes in arbitrary positions.
  subplot    - Create axes in tiled positions.
  daspect    - Data aspect ratio.
  pbaspect   - Plot box aspect ratio.
  xlim       - X limits.
  ylim       - Y limits.
  zlim       - Z limits.

Viewpoint control.
  view       - 3-D graph viewpoint specification.
  viewmtx    - View transformation matrix.
  rotate3d   - Interactively rotate view of 3-D plot.

Camera control.
  campos     - Camera position.
  camtarget  - Camera target.
  camva      - Camera view angle.
  camup      - Camera up vector.
  camproj    - Camera projection.

High level camera control.
  camorbit   - Orbit camera.
  campan     - Pan camera.
  camdolly   - Dolly camera.
  camzoom    - Zoom camera.
  camroll    - Roll camera.
  camlookat  - Move camera and target to view specified objects.
  cameratoolbar - Interactively manipulate camera.

High level light control.
  camlight   - Creates or sets position of a light.
```

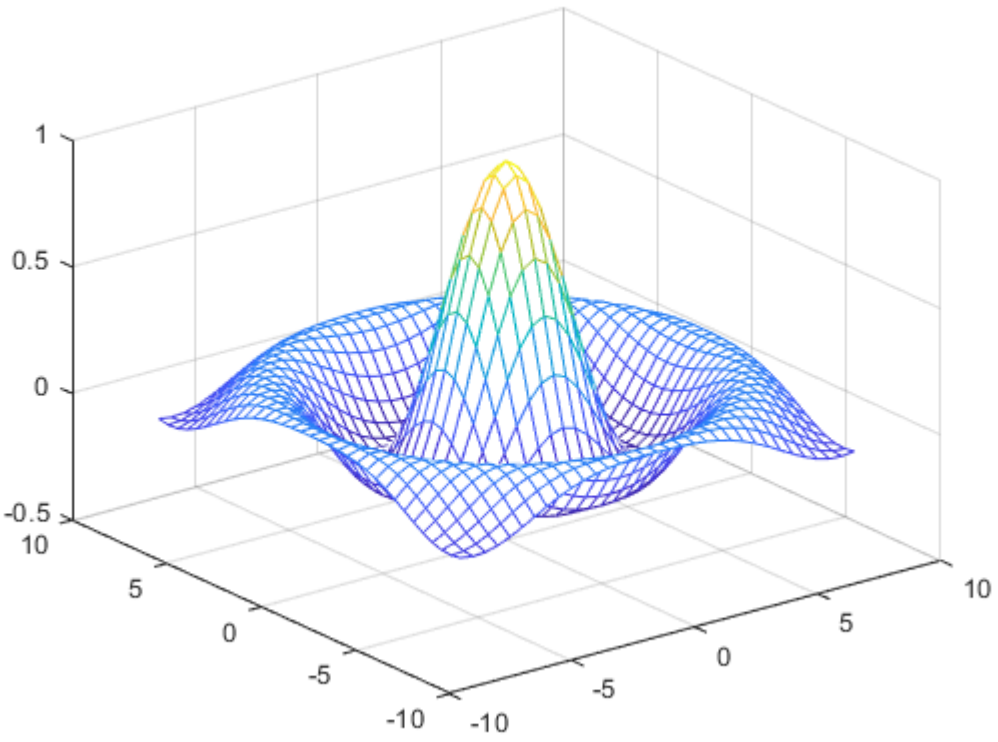
```
    lightangle - Spherical position of a light.

  Graph annotation.
    title      - Graph title.
    xlabel     - X-axis label.
    ylabel     - Y-axis label.
    zlabel     - Z-axis label.
    text       - Text annotation.
    gtext      - Mouse placement of text.
    plotedit   - Experimental graph editing and annotation tools.

  Hardcopy and printing.
    print      - Print graph or Simulink system; or save graph to MATLAB file.
    printopt   - Printer defaults.
    orient     - Set paper orientation.

  See also graph2d, specgraph.
```

```
clear;clc;clf
t = 0:pi/50:10*pi;
st = sin(t);
ct = cos(t);
plot3(st,ct,t)
```



mesh : Mesh plot

```
[X,Y] = meshgrid(-8:.5:8);
R = sqrt(X.^2 + Y.^2) + eps;
Z = sin(R)./R;
mesh(X,Y,Z)
```

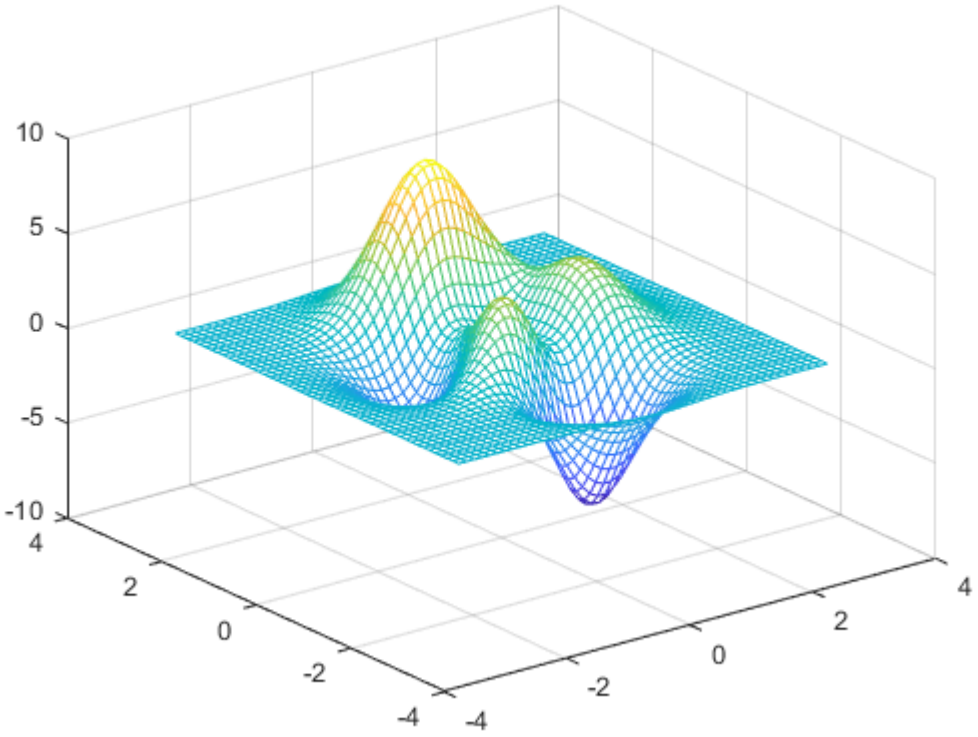


peaks

```
clear;clc;clf
z1 = peaks; %49*49的矩陣
z2 = peaks(75); %75*75的矩陣
[x y z] = peaks;
whos
```

```
  Name        Size              Bytes  Class     Attributes

  x          49x49             19208  double
  y          49x49             19208  double
  z          49x49             19208  double
  z1         49x49             19208  double
  z2         75x75             45000  double
```

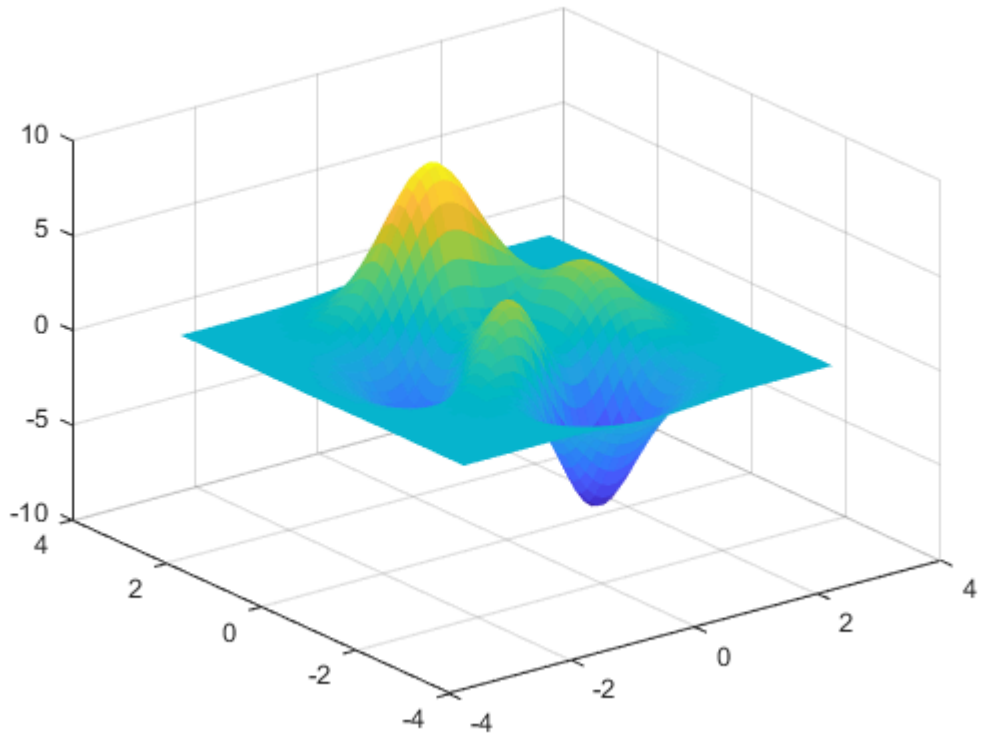
```
mesh(x,y,z) %網狀圖
```



surf

shading

```
surf(x,y,z)
shading flat
```



5) pcolor

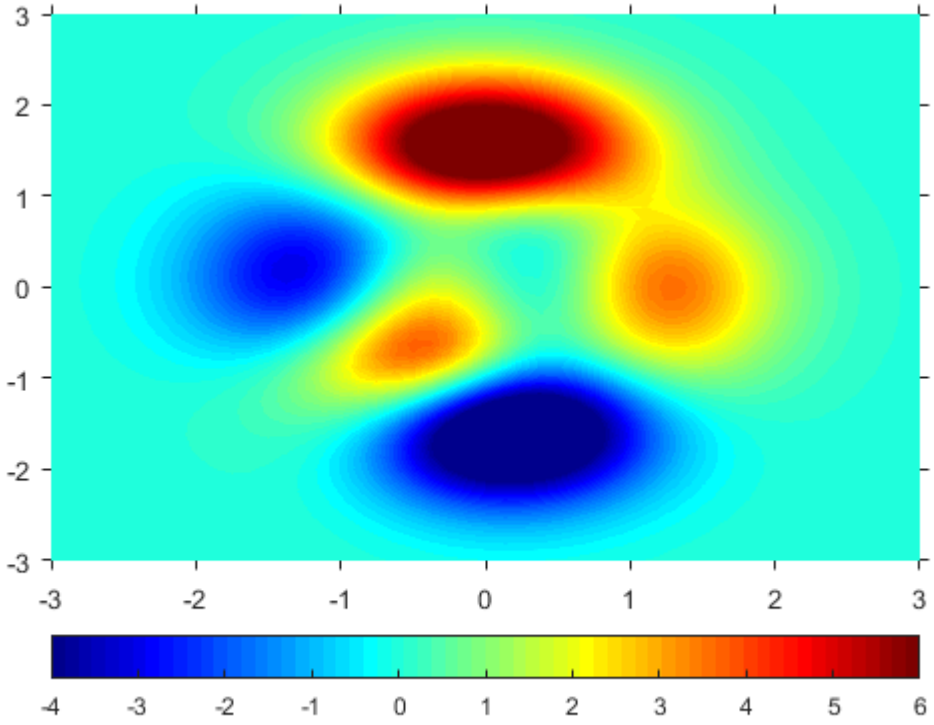
Pseudocolor plot

```
pcolor(x,y,z)
colormap('jet')
colorbar('horizontal') %放橫的colorbar
shading interp % 漸進內插(讓圖型平滑一點)
set(gca,'tickdir','out')
```

6)caxis

Set colormap limit

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




```
%把 colormap的區間範圍從 -6 到 8 改成 -4 到 6
```

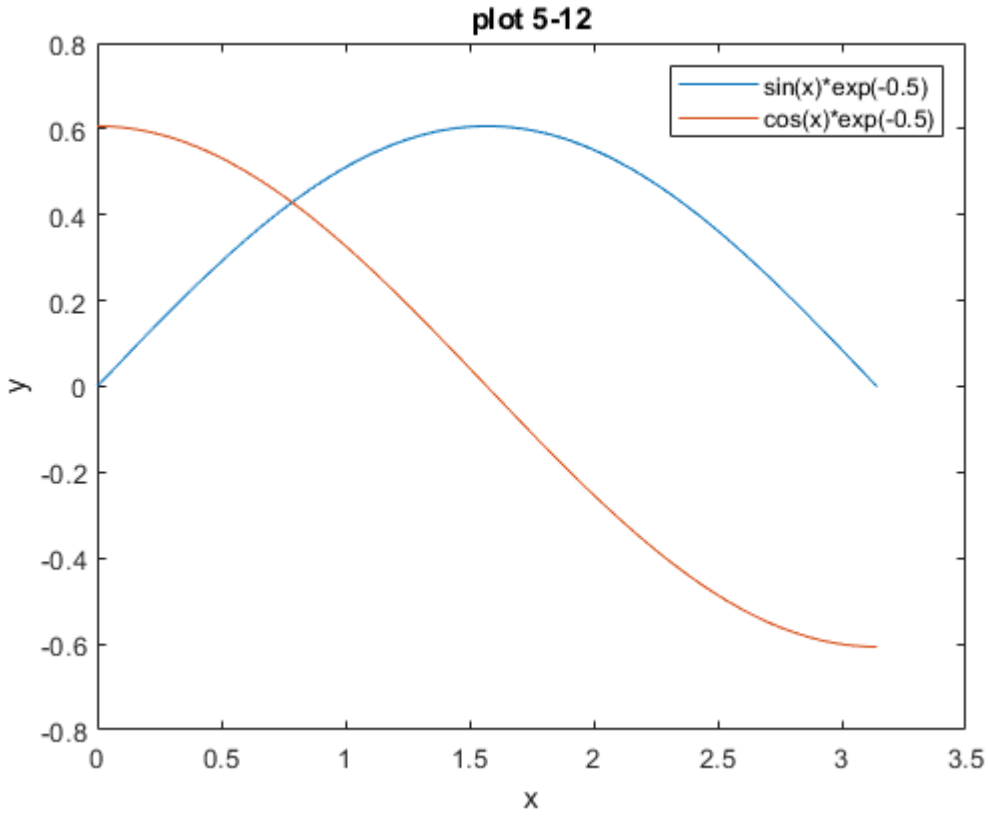
7) 作業2-2

EX-5-11

```
clear;clc;clf
x1 = linspace(0,2*pi,100);
y1 = sin(x1)./(x1+1);
plot(x1,y1)
title('my plot');xlabel('time');ylabel('speed')
```

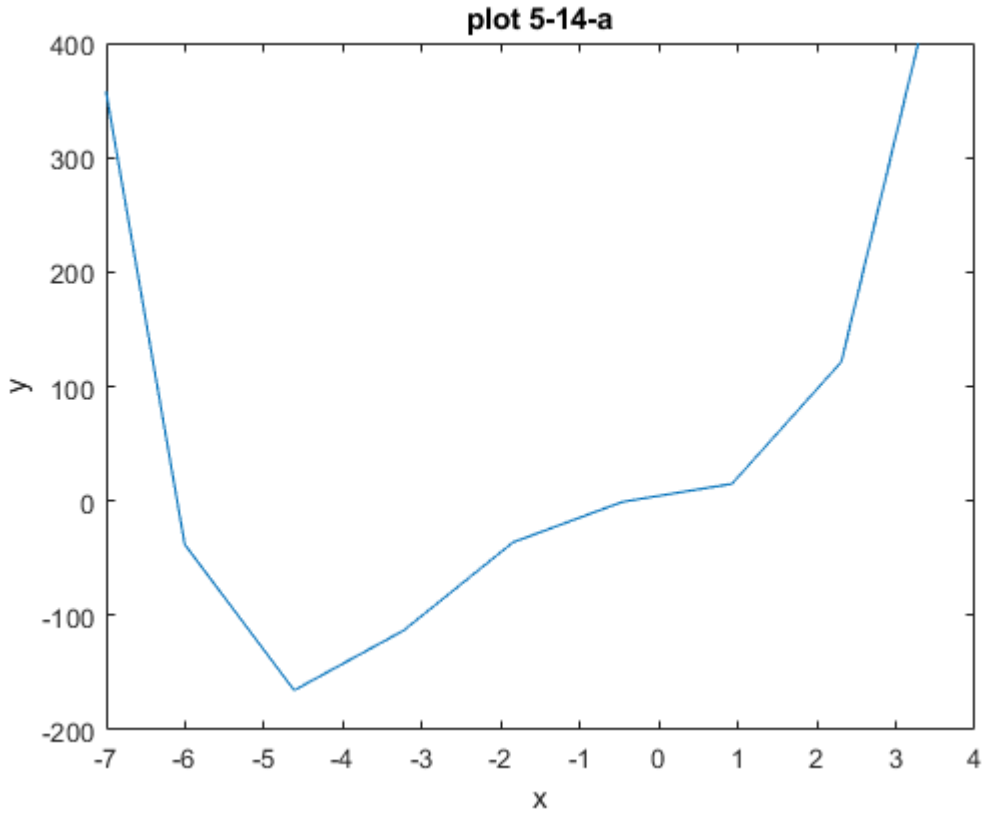
EX-5-12

```
clear;clc;clf
x2 = linspace(0,pi,100);
y21 = sin(x2).*exp(-0.5);
plot(x2,y21)
hold on
y22 = cos(x2).*exp(-0.5);
plot(x2,y22)
hold off
title('plot 5-12');xlabel('x');ylabel('y');
legend('sin(x)*exp(-0.5)','cos(x)*exp(-0.5)')
```

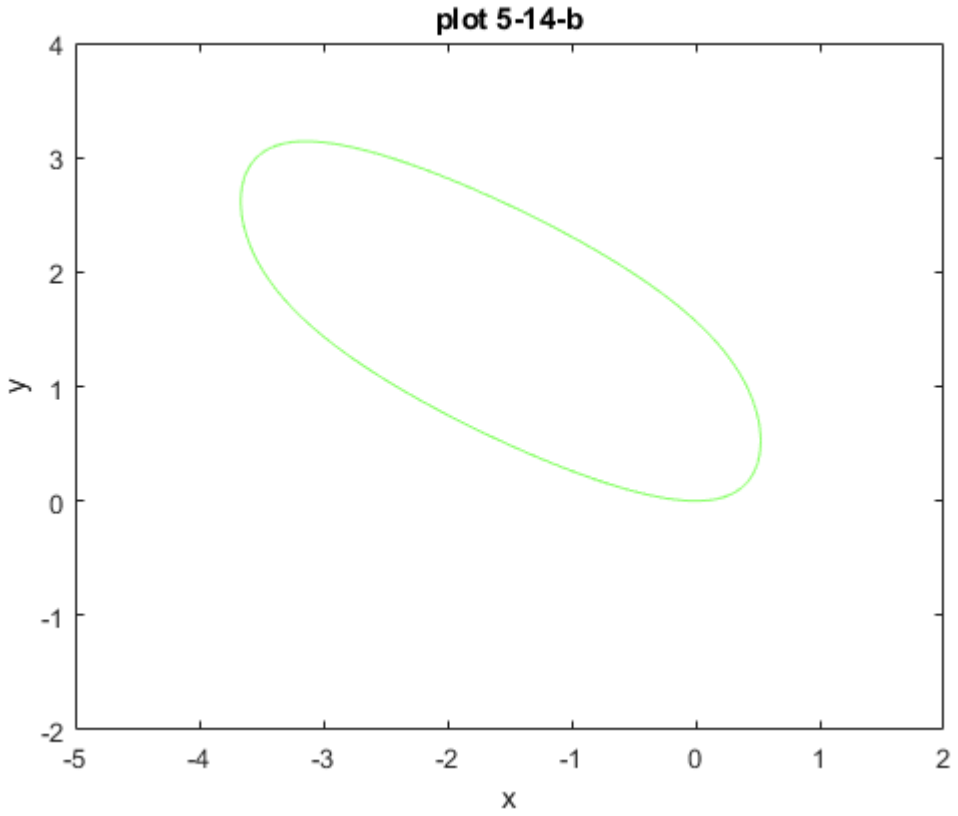


EX-5-14

```
clear;clc;clf
% (a)
figure(1)
ezplot('x^4+6*x^3+7*x+3',[-7,4,-200,400])
title('plot 5-14-a');xlabel('x');ylabel('y')
```

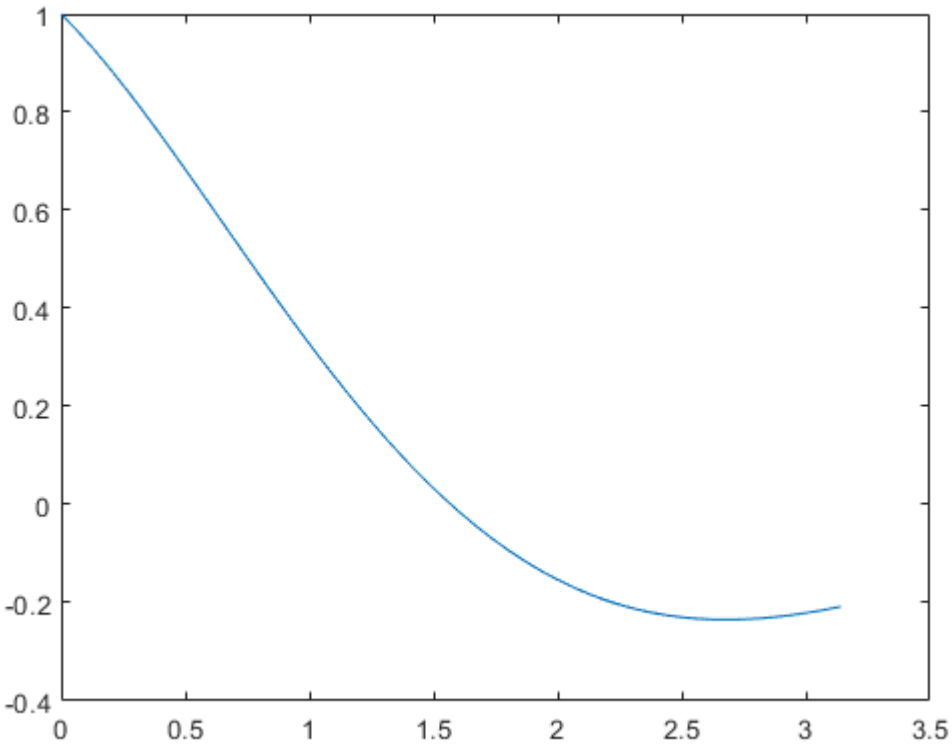



```
% (b)
figure(2)
ezplot('sin(y)+cos(x+y)-1',[-5,2,-2,4])
title('plot 5-14-b');xlabel('x');ylabel('y')
```

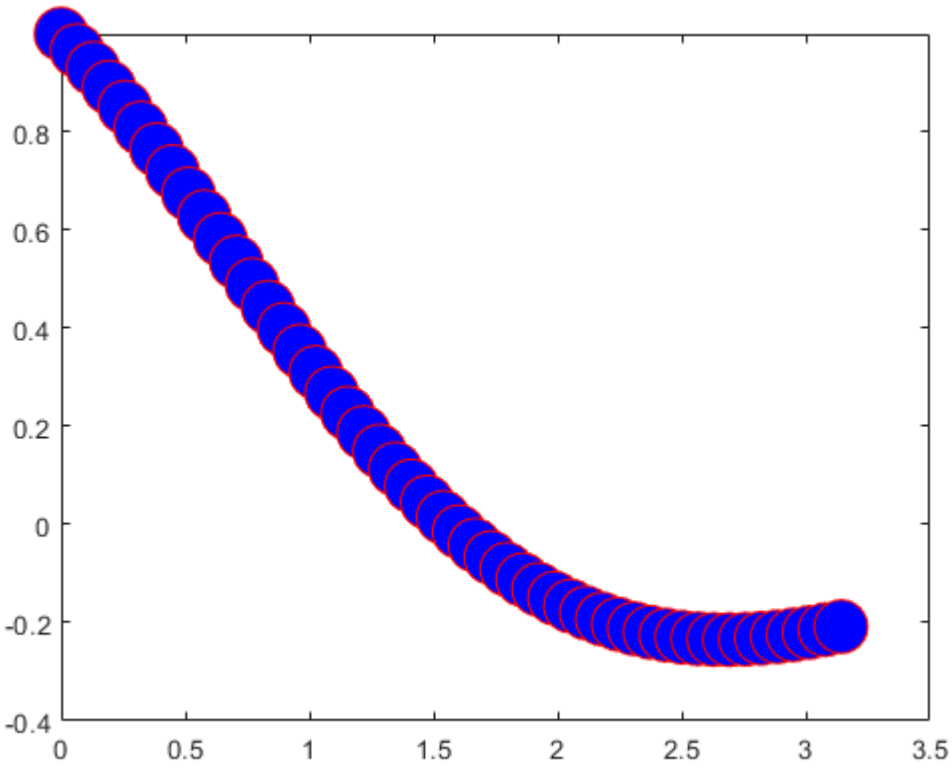


EX-5-15

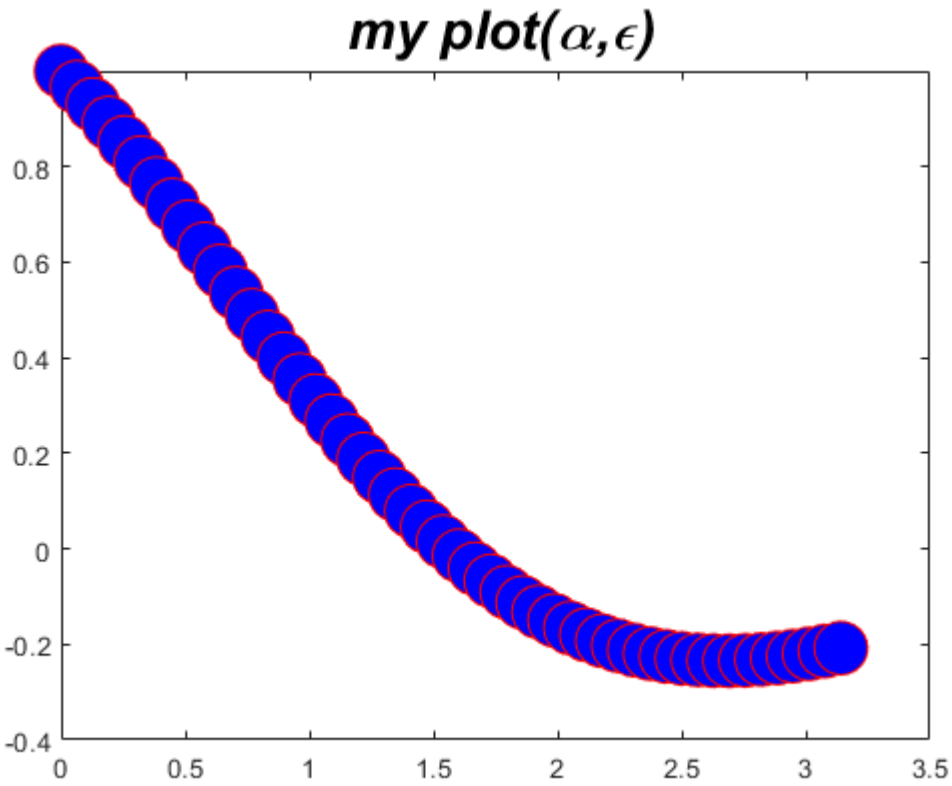
```
clear;clc;clf
% (a)
 x3 = linspace(0,pi,50);
 y3 = cos(x3).*exp(-0.5.*x3);
 plot(x3,y3)
```




```
% (b)
 plot(x3,y3,'r--o','MarkerFaceColor','b','MarkerSize',20)
```



```
% (c)
 plot(x3,y3,'r--o','MarkerFaceColor','b','MarkerSize',20)
 title('\it my plot(\alpha,\epsilon)','FontSize',20,'FontName','Helvetica')    % 斜體 : 使用\it
```




```
                                                                % 字體 : FontName
```