Table of Contents

Demonstrates the creation of bar plots.

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
USA = [-6.3, -4.3, 0.1, 5.9, 12.1, 17.1, ...
       19.9, 18.9, 14.4, 7.7, 0.4, -4.8];
hb = bar(USA);
ha = gca;
    axis([0, 13, -30, 30])
    ha.XTickLabel = {'Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', ...
                     'July', 'Aug', 'Sept', 'Oct', 'Nov', 'Dec'};
CAN = [-24.6, -23.3, -18.7, -9.8, -0.3, 7.2, ...
       11.1, 9.5, 3.5, -4.4, -14.5, -21.5];
GBR = [3.0, 3.0, 4.7, 6.7, 9.8, 12.8, ...
       14.4, 14.3, 12.2, 9.5, 5.5, 3.9];
y = [USA', CAN', GBR'];
delete(hb);
hold on
hb = bar(y);
    hb(1).BarWidth = 1.0;
    hb(2).BarWidth = 1.0;
    hb(3).BarWidth = 1.0;
title('Average Monthly Temperature (1961-1999)')
ylabel('Temperature (\circC)')
legend('United States', 'Canada', 'United
 Kingdom', 'Location', 'best')
```
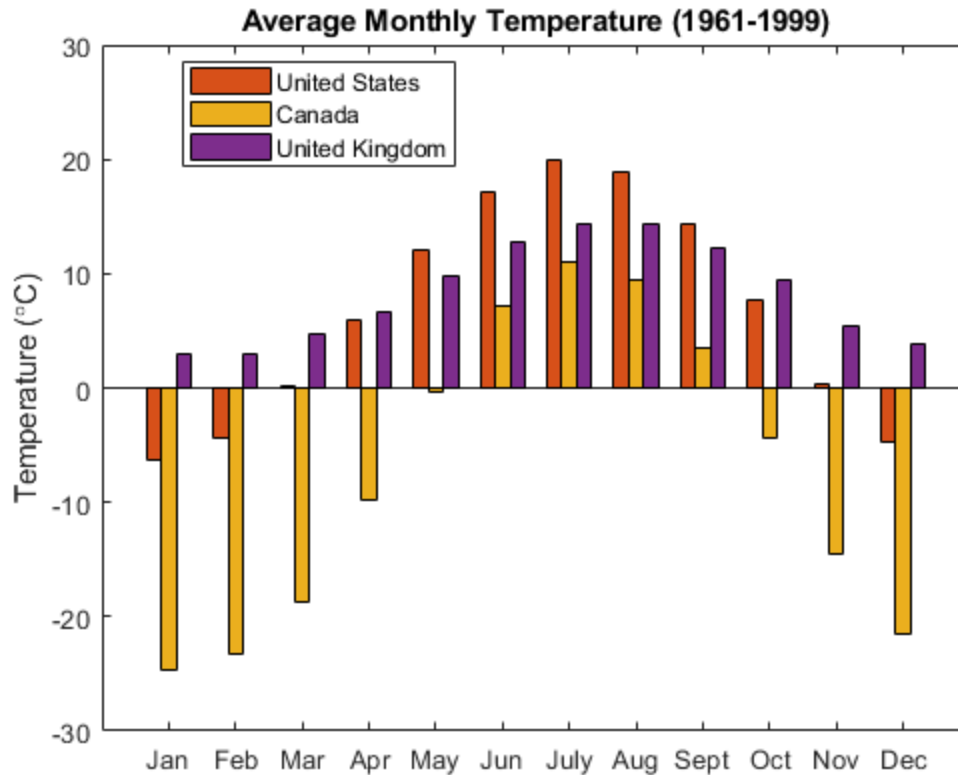
Demonstrates the creation of pie plots.

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
world = 29.85;
CHN = 7.03; USA = 5.46; IND = 1.74;
RUS = 1.71; JPN = 1.21; DEU = 0.79;
others = world - CHN - USA - IND - RUS - JPN - DEU;
x = [CHN, USA, IND, RUS, JPN, DEU, others];
explode = [1, 1, 1, 1, 1, 1, 1];
countries = {'China', 'United States', 'India', ...
    'Russia', 'Japan', 'Germany', 'Other Countries'};
for k = 1:7
    labels{k} = [countries{k}, sprintf(' (%.1f%%)', x(k)/world*100)];
end
h = pie(x, explode, labels)
    h(2).FontSize = 12;
    h(4).FontSize = 12;
    h(6).FontSize = 12;
    h(8).FontSize = 12;
    h(10).FontSize = 12;
    h(12).FontSize = 12;
    h(14).FontSize = 12;
```
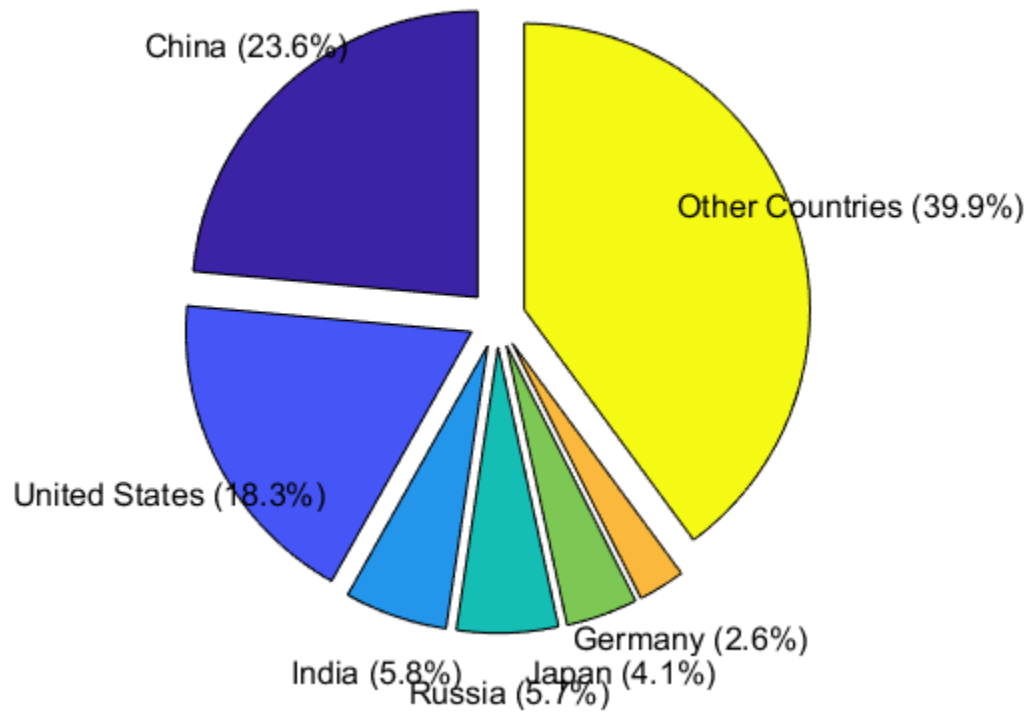
```
h =

  1×14 graphics array:

  Columns 1 through 8

    Patch    Text      Patch    Text      Patch    Text      Patch
Text

  Columns 9 through 14

    Patch    Text      Patch    Text      Patch    Text
```


Creates a 3-D line plot using the parameteric equations: (pratice gradient)

```matlab
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
z = linspace(0, 8*pi, 200);
x = exp(-z/20).*cos(z);
y = exp(-z/20).*sin(z);
plot3(x,y,z)
xlabel x, ylabel y, zlabel z
```

```
axis([-1, 1, -1, 1, 0, 8*pi])
h = gca; h.BoxStyle = 'full'; box on
grid on
axis vis3d
```
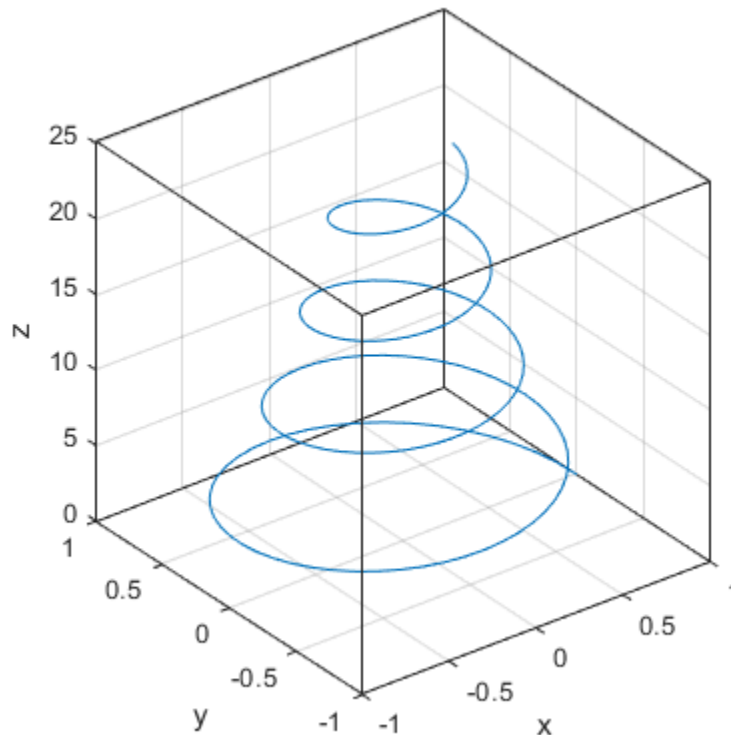

Creates a surface in the 3-D space described by the equation z(x, y)

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
x = linspace(0,2*pi,100);
y = linspace(0,  pi, 50);
[X,Y] = meshgrid(x, y);
Z = sin(X) .* cos(Y);
hs = surf(X, Y, Z);
xlabel x, ylabel y, zlabel z
ha = gca;
    axis([0, 2*pi, 0, pi, -1, 1])
    ha.XTick = [0, pi/2, pi, 3*pi/2, 2*pi];
    ha.YTick = [0, pi/2, pi];
    ha.XTickLabel = {'0', '\pi/2', '\pi', '3\pi/2', '2\pi'};
    ha.YTickLabel = {'0', '\pi/2', '\pi'};
    axis vis3d
    axis equal
```

```
        ha.BoxStyle = 'full';
        box on
        grid on
colorbar
% colormap hot
%       hs.FaceAlpha = 0.2;
%       hs.EdgeColor = 'none';
```
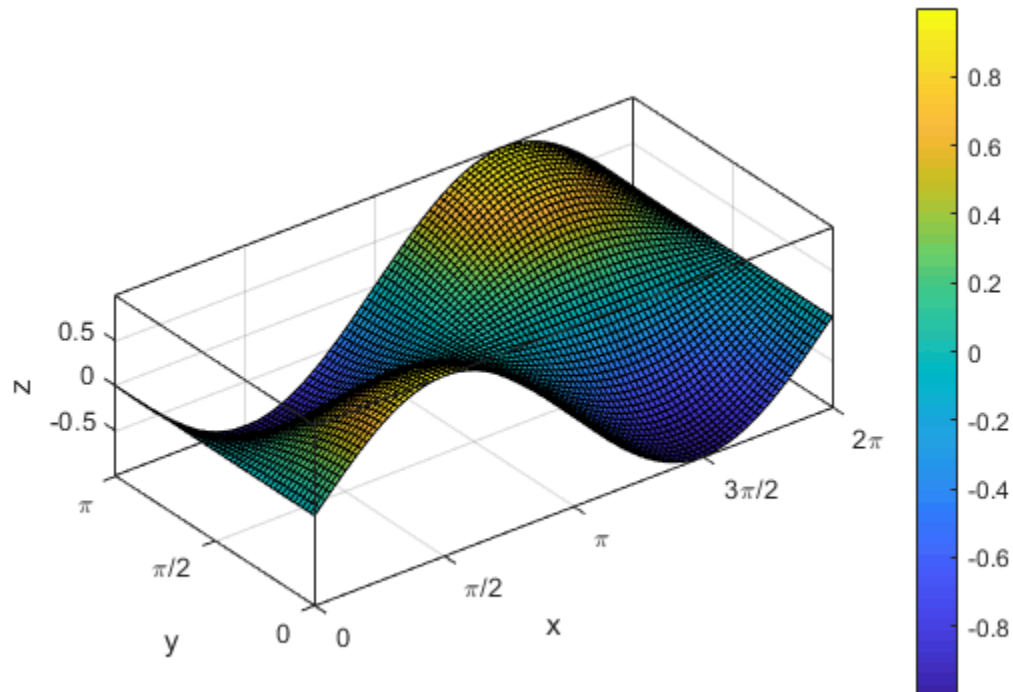

Plots a spherical surface of radius 2a centered at the origin, a cylindrical surface of radius a and length 4a, centered at (a, 0, 0), and their intersection curve given by the equations
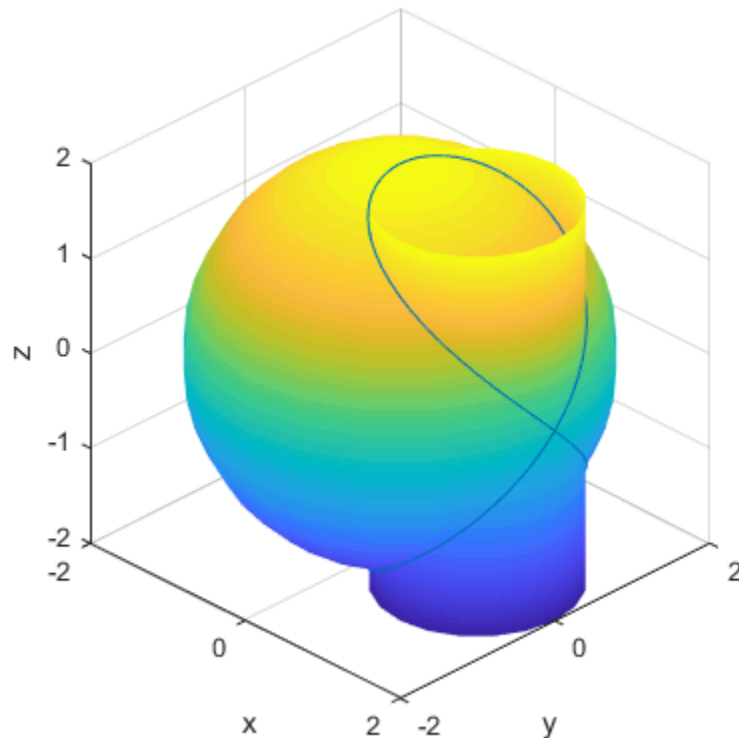
```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
a = 1;
[X,Y,Z] = sphere;
surf(2*a*X,2*a*Y,2*a*Z)
hold on
[X,Y,Z] = cylinder;
surf(a*X+a,a*Y,4*a*Z-2*a)
shading interp %shading#########
```

```
t = linspace(0,4*pi);
x = a*(1+cos(t));
y = a*sin(t);
z = 2*a*sin(t/2);
plot3(x,y,z)
axis equal % #########################
axis vis3d % #############################
xlabel x, ylabel y, zlabel z
view(45,30) % ##Cartesian######  VIEW###########
```


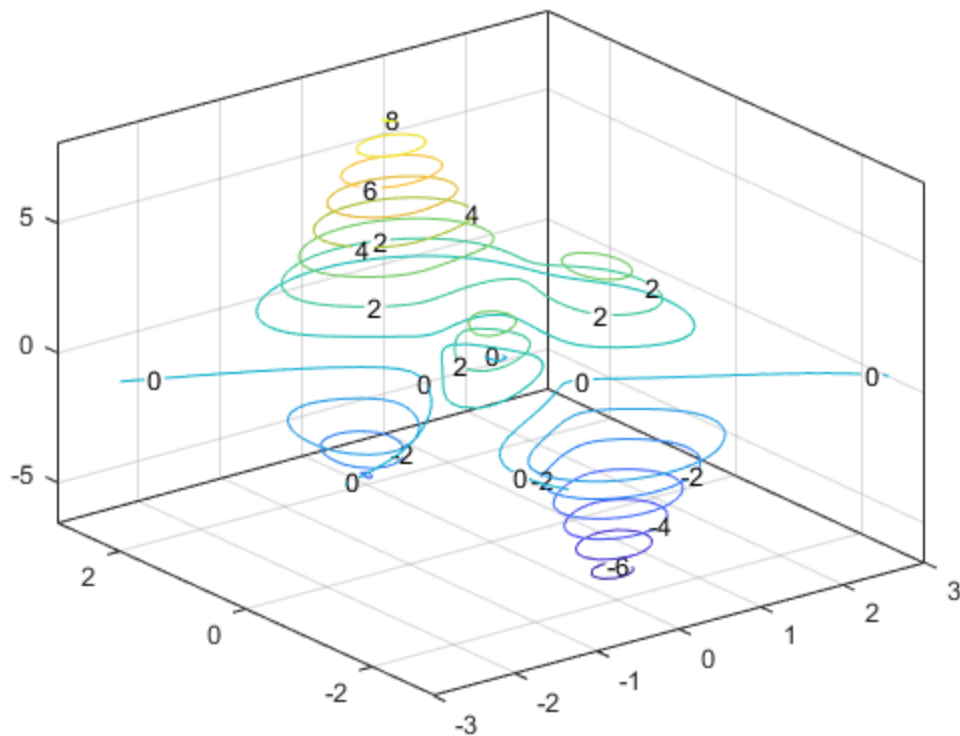# Demonstrates the creation of contour plots.

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
[X,Y,Z] = peaks;
surf(X,Y,Z)
[C,h] = contour(X,Y,Z, [-6:8]);
% colorbar % colorbar ##############
colormap % #########colormap ##
    h.ShowText = 'on';
    h.TextList = [-6:2:8];
[C,h] = contourf(X,Y,Z, [-6:8]);
clabel(C,h, [-6:2:8])
[C,h] = contour3(X,Y,Z, [-6:8]);
clabel(C,h, [-6:2:8])
```

```
ans =

    0.2422    0.1504    0.6603
    0.2504    0.1650    0.7076
    0.2578    0.1818    0.7511
    0.2647    0.1978    0.7952
    0.2706    0.2147    0.8364
    0.2751    0.2342    0.8710
    0.2783    0.2559    0.8991
    0.2803    0.2782    0.9221
    0.2813    0.3006    0.9414
    0.2810    0.3228    0.9579
    0.2795    0.3447    0.9717
    0.2760    0.3667    0.9829
    0.2699    0.3892    0.9906
    0.2602    0.4123    0.9952
    0.2440    0.4358    0.9988
    0.2206    0.4603    0.9973
    0.1963    0.4847    0.9892
    0.1834    0.5074    0.9798
    0.1786    0.5289    0.9682
    0.1764    0.5499    0.9520
    0.1687    0.5703    0.9359
    0.1540    0.5902    0.9218
    0.1460    0.6091    0.9079
    0.1380    0.6276    0.8973
    0.1248    0.6459    0.8883
    0.1113    0.6635    0.8763
    0.0952    0.6798    0.8598
    0.0689    0.6948    0.8394
    0.0297    0.7082    0.8163
    0.0036    0.7203    0.7917
    0.0067    0.7312    0.7660
    0.0433    0.7411    0.7394
    0.0964    0.7500    0.7120
    0.1408    0.7584    0.6842
    0.1717    0.7670    0.6554
    0.1938    0.7758    0.6251
    0.2161    0.7843    0.5923
    0.2470    0.7918    0.5567
    0.2906    0.7973    0.5188
    0.3406    0.8008    0.4789
    0.3909    0.8029    0.4354
    0.4456    0.8024    0.3909
    0.5044    0.7993    0.3480
    0.5616    0.7942    0.3045
    0.6174    0.7876    0.2612
    0.6720    0.7793    0.2227
    0.7242    0.7698    0.1910
    0.7738    0.7598    0.1646
    0.8203    0.7498    0.1535
    0.8634    0.7406    0.1596
    0.9035    0.7330    0.1774
```

```
0.9393    0.7288    0.2100
0.9728    0.7298    0.2394
0.9956    0.7434    0.2371
0.9970    0.7659    0.2199
0.9952    0.7893    0.2028
0.9892    0.8136    0.1885
0.9786    0.8386    0.1766
0.9676    0.8639    0.1643
0.9610    0.8890    0.1537
0.9597    0.9135    0.1423
0.9628    0.9373    0.1265
0.9691    0.9606    0.1064
0.9769    0.9839    0.0805
```
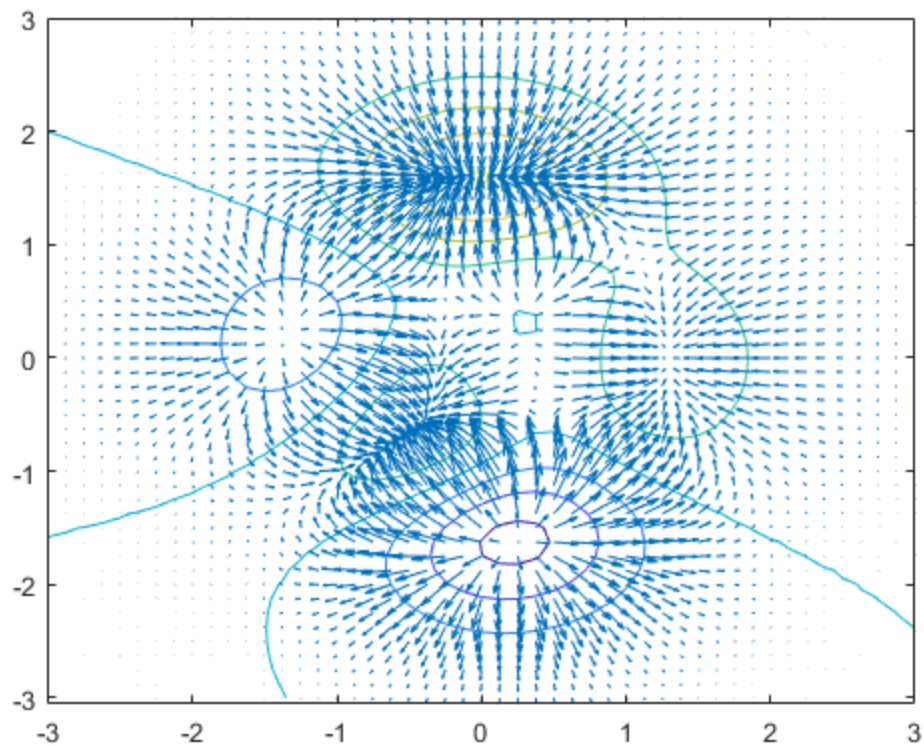

Demonstrates the creation of a 2-D vector plot.

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
[X,Y,Z] = peaks;
contour(X,Y,Z); % contour ####z ################30 #############
hold on
[U, V] = gradient(Z, 0.2, 0.2); % #########F(x,y,z)
quiver(X, Y, U, V, 3) % ##########
```
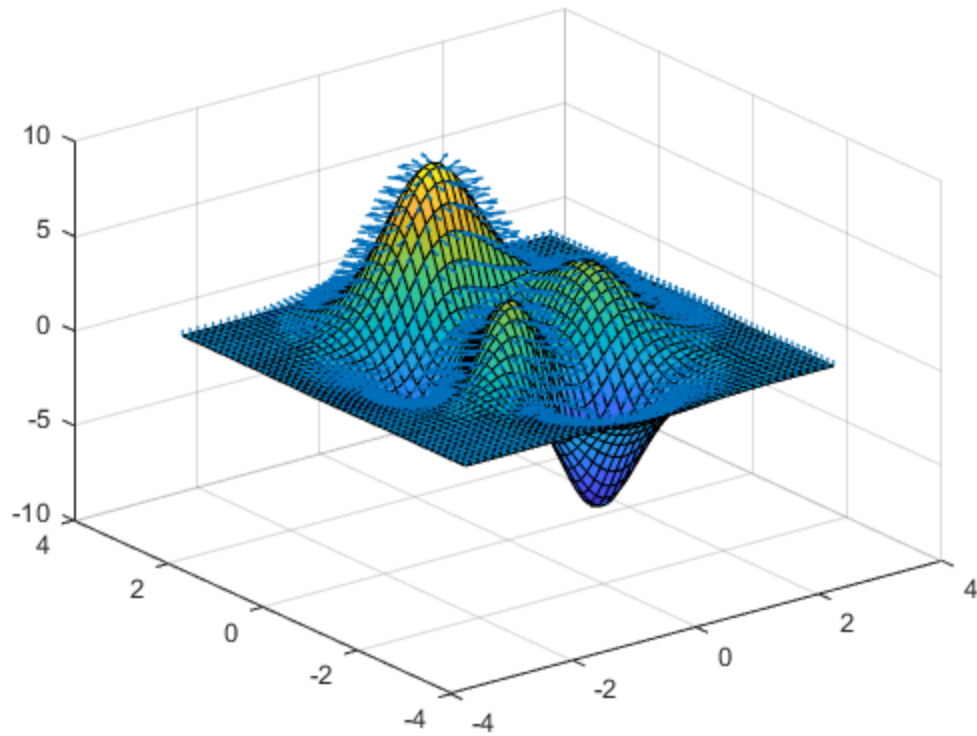
Demonstrates the creation of a 3-D vector plot.

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
[X,Y,Z] = peaks;
surf(X,Y,Z);
limits = axis
hold on
[U,V,W] = surfnorm(X,Y,Z);
quiver3(X, Y, Z, U, V, W) % ###quiver#############
axis(limits)


limits =

    -4     4    -4     4   -10    10
```
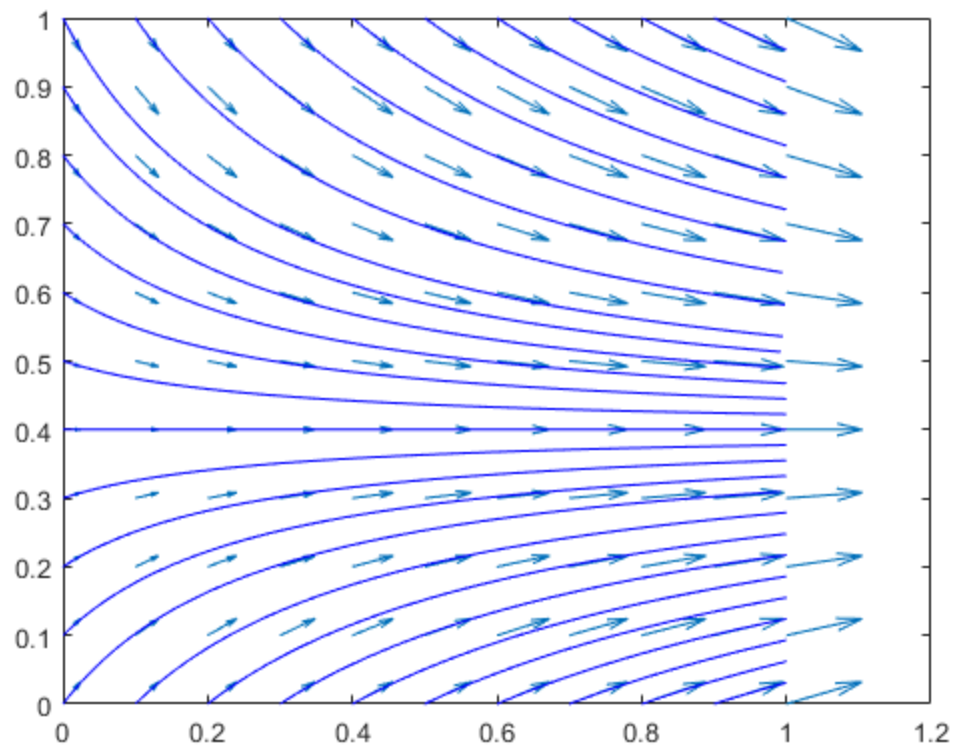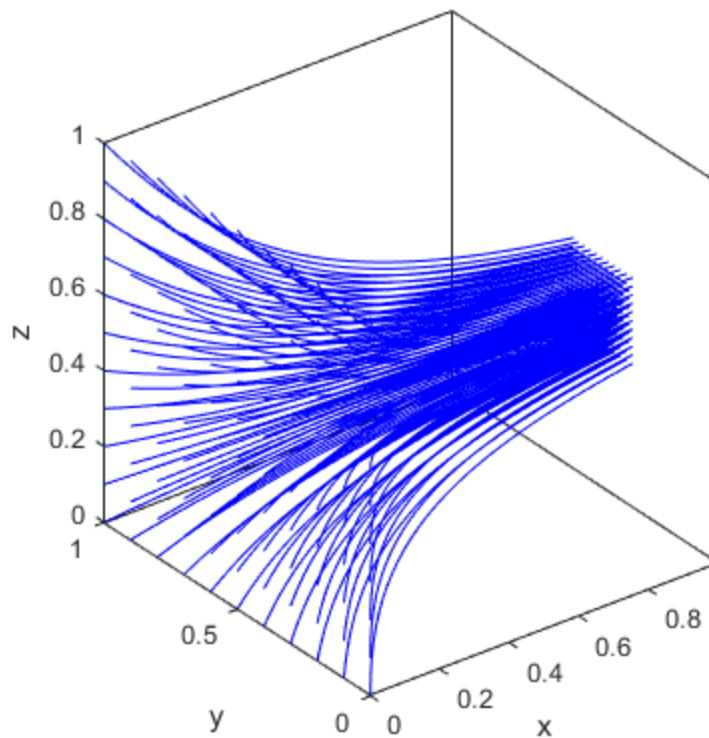
Creates a 2-D streamline plot for the flow described

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
x = 0:0.1:1; y = 0:0.1:1;
[X,Y] = meshgrid(x,y);
U = 0.3+X; V = 0.4-Y;
quiver(X,Y,U,V)
sx = [0:0.1:1, zeros(1,11), 0:0.1:1];
sy = [zeros(1,11), 0:0.1:1, ones(1,11)];
SL = stream2(X,Y, U,V, sx,sy);
streamline(SL) % Plot streamlines from 2-D or 3-D vector data
```

Creates a 3-D streamline plot for the flow described

```
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
x = 0:0.1:1; y = 0:0.1:1; z = 0:0.1:1;
[X,Y,Z] = meshgrid(x,y,z);
U = 0.3+X; V = 0.4-Y; W = 0.5-Z;
% quiver3(X,Y,Z,U,V,W)
sx = 0;
sy = 0:0.1:1;
sz = 0:0.1:1;
[Sx, Sy, Sz] = meshgrid(sx,sy,sz);
SL = stream3(X,Y,Z, U,V,W, Sx,Sy,Sz);
streamline(SL)
view(3), axis vis3d, box on
xlabel('x'), ylabel('y'), zlabel('z')
```
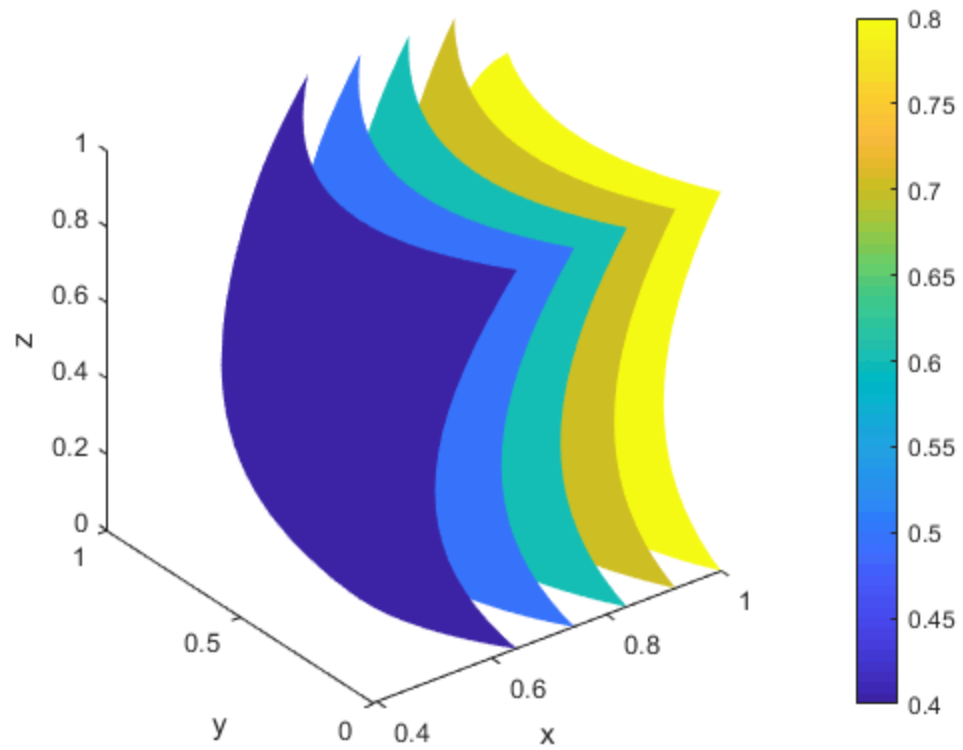
Creates an isosurface plot for the potential function described

```matlab
clc % ##command window
clear all % ##WorkSpace##
close all %  ######
x = 0:0.05:1; y = 0:0.05:1; z = 0:0.05:1;
[X,Y,Z] = meshgrid(x,y,z);
V = 0.3*X+0.4*Y+0.5*Z+0.5*X.^2-0.5*Y.^2-0.5*Z.^2;
colorbar
hold on
for isovalue = 0.4:0.1:0.8
    isosurface(X,Y,Z,V, isovalue) % ??#?####?###. #?##?###?
end
view(3), axis vis3d
xlabel('x'), ylabel('y'), zlabel('z')
```

Published with MATLAB® R2018a