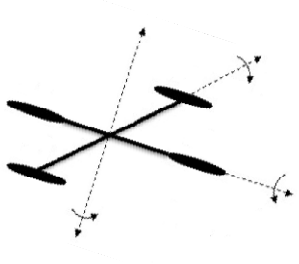
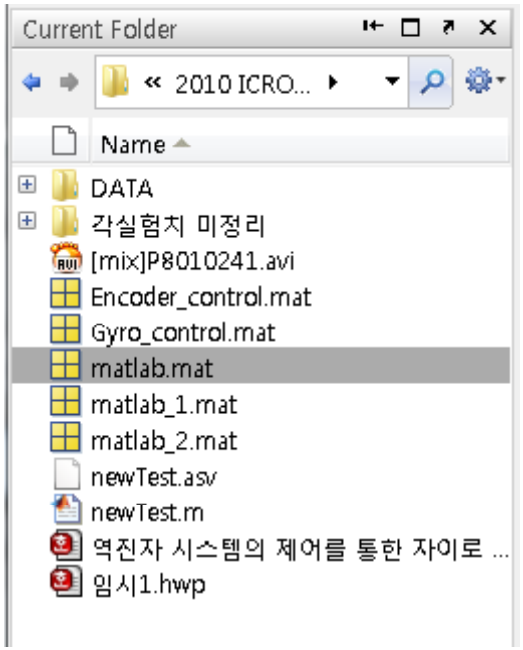
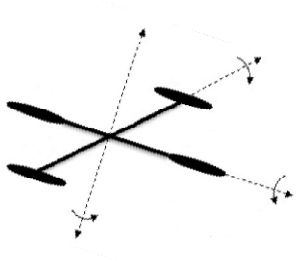
M A T L A B

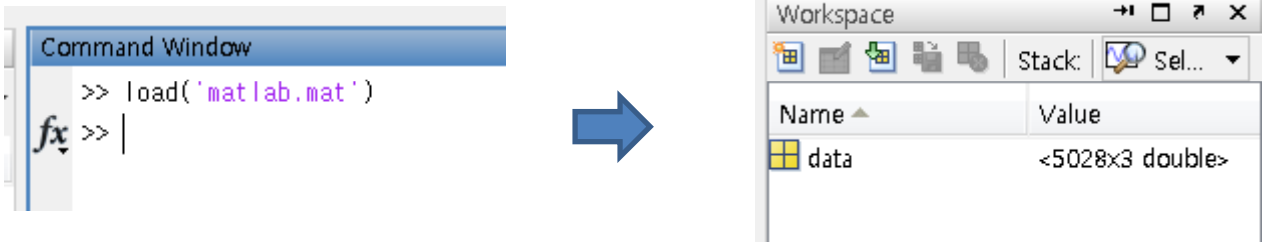
기초 연산법 및 그래프 출력 2



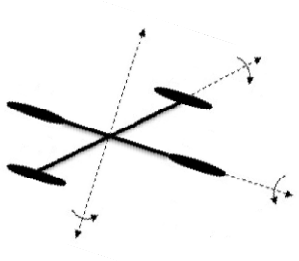
- Mat 파일 읽기


Current Folder
« 2010 ICRO...
Name
DATA
각실험치 미정리
[mix]P8010241.avi
Encoder_control.mat
Gyro_control.mat
matlab.mat
matlab_1.mat
matlab_2.mat
newTest.asv
newTest.m
역진자 시스템의 제어를 통한 자이로 ...
임시1.hwp

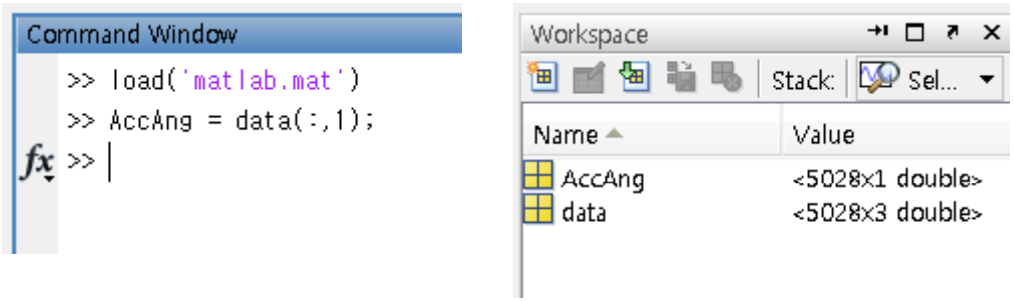




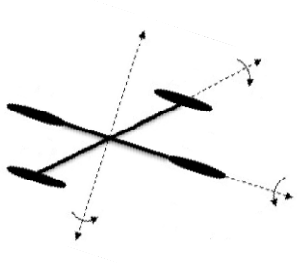
1열 : 가속도센서에서 추출한 각도
2열 : 자이로센서에서 추출한 각속도
3열 : 엔코더에서 추출한 각도



- 행렬에서 콜론(:) 연산자

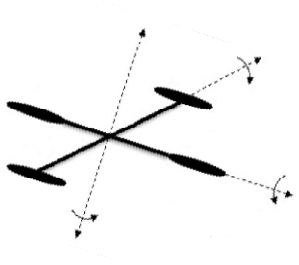


(:, 1) => 1열 전체 선택

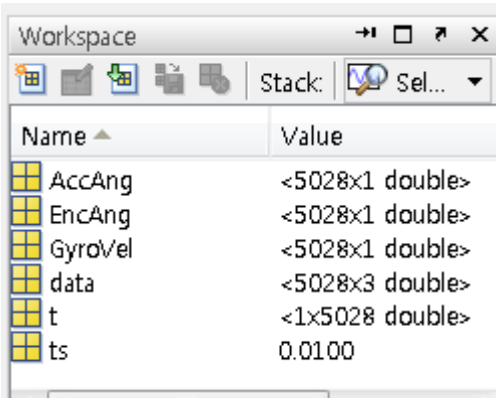


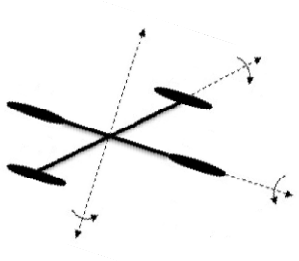
```
>> data(1:5,1)

ans =

   -3.0000
    6.2000
    8.0000
    6.4000
   10.6000

fx >>
```

1열의 1행부터 5행까지 선택



```
1   load('matlab.mat')
2
3   AccAng = data(:,1);
4   GyroVel = data(:,2);
5   EncAng = data(:,3);
6
7   ts = 0.01;
8
9   t = 0:ts:(length(EncAng)-1)/100;
```

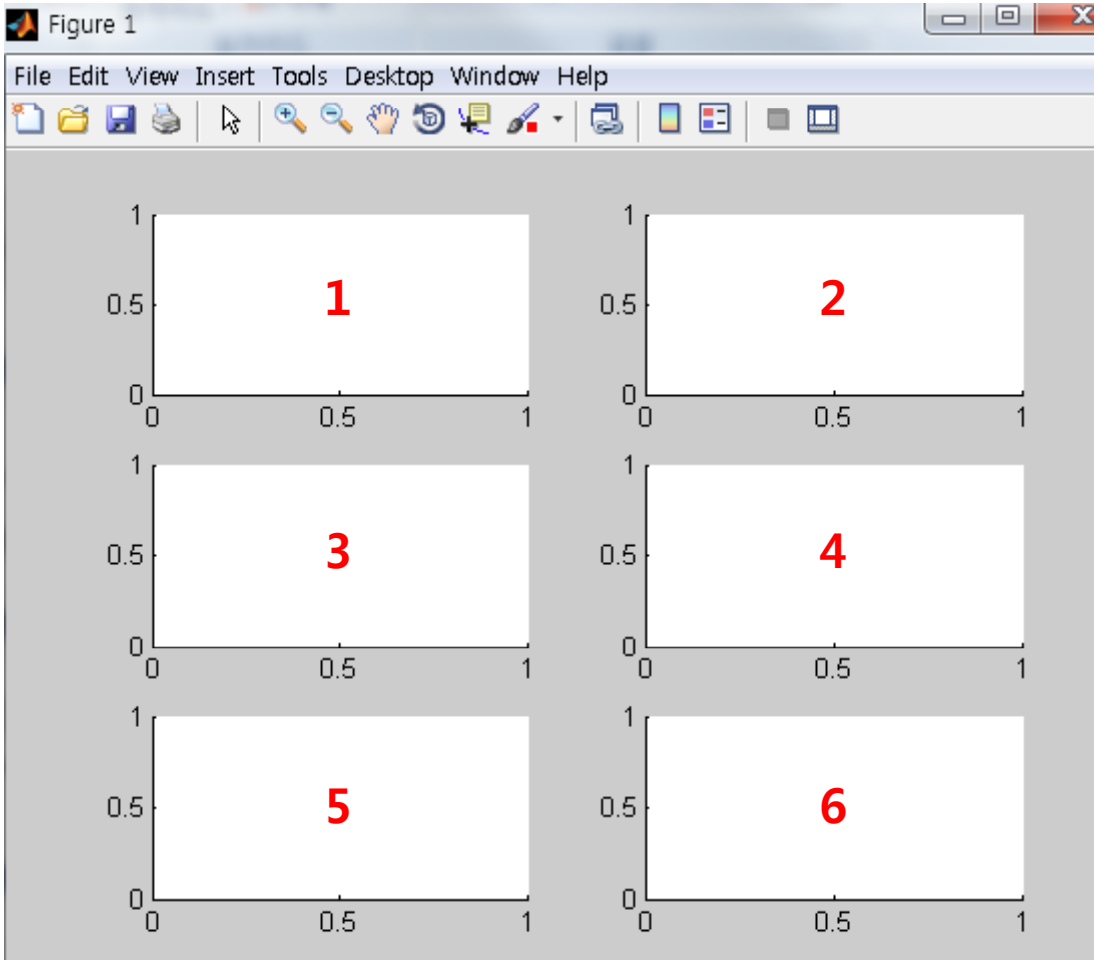


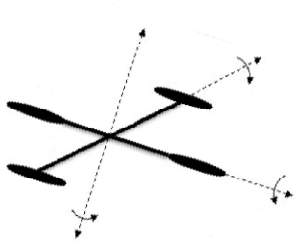


- 다중 그래프 표현

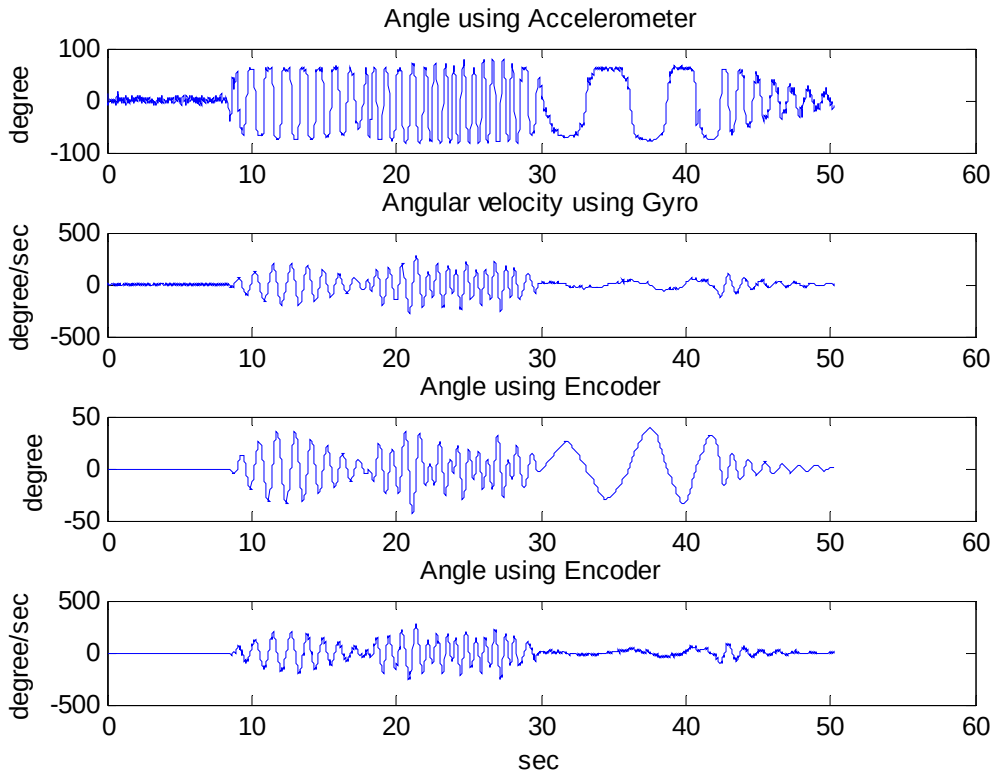
```
Command Window
>> figure
>> subplot(3,2,1)
>> subplot(3,2,2)
>> subplot(3,2,3)
>> subplot(3,2,4)
>> subplot(3,2,5)
>> subplot(3,2,6)
>>
```

subplot(행수, 열수, 번호)



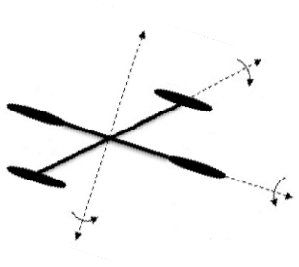


```
load('matlab.mat')

AccAng = data(:,1)*180/pi;
GyroVel = data(:,2)*0.007*180/pi;
EncAng = data(:,3);

ts = 0.01;

t = 0:ts:(length(EncAng)-1)/100;

DiffEnc = [0; diff(EncAng)/ts];

figure
subplot(4,1,1);
    plot(t, AccAng)
    title('Angle using Accelerometer');
    ylabel('degree')
subplot(4,1,2);
    plot(t, GyroVel)
    title('Angular velocity using Gyro');
    ylabel('degree/sec')
subplot(4,1,3);
    plot(t, EncAng)
    title('Angle using Encoder');
    ylabel('degree')
subplot(4,1,4);
    plot(t, DiffEnc)
    title('Angle using Encoder');
    ylabel('degree/sec')
    xlabel('sec')
```



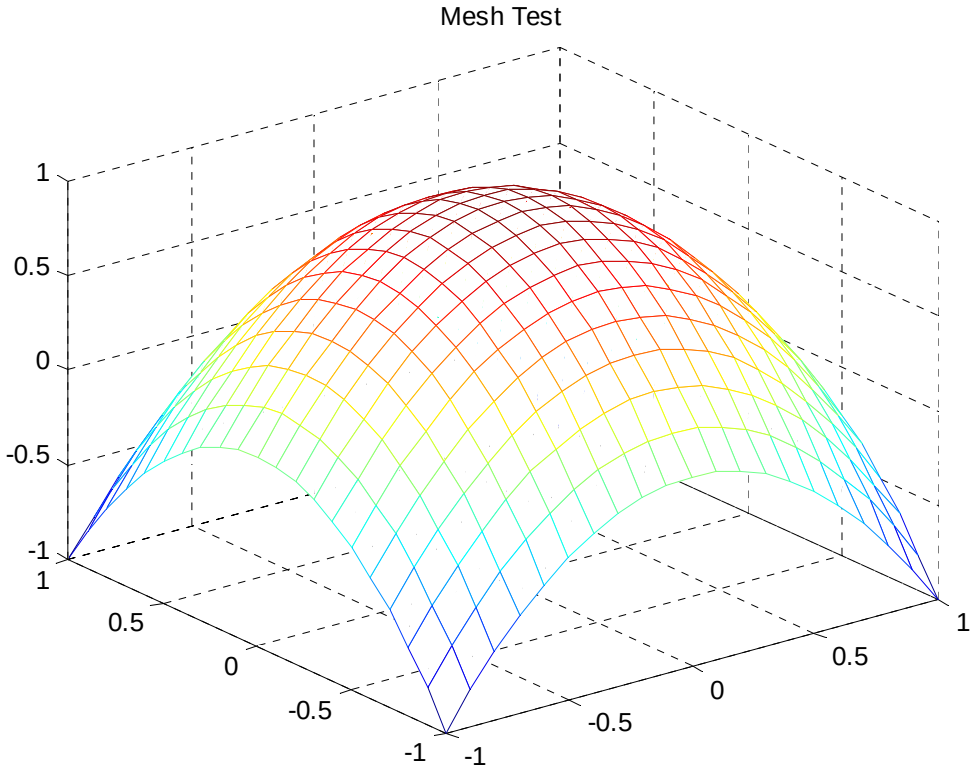
- 3차원 그래프

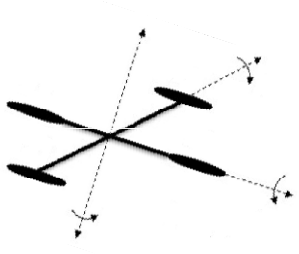
```
Command Window
>> [X, Y] = meshgrid(-1:0.5:1)

X =

   -1.0000   -0.5000         0    0.5000    1.0000
   -1.0000   -0.5000         0    0.5000    1.0000
   -1.0000   -0.5000         0    0.5000    1.0000
   -1.0000   -0.5000         0    0.5000    1.0000
   -1.0000   -0.5000         0    0.5000    1.0000


Y =

   -1.0000   -1.0000   -1.0000   -1.0000   -1.0000
   -0.5000   -0.5000   -0.5000   -0.5000   -0.5000
         0         0         0         0         0
    0.5000    0.5000    0.5000    0.5000    0.5000
    1.0000    1.0000    1.0000    1.0000    1.0000

fx >>
```



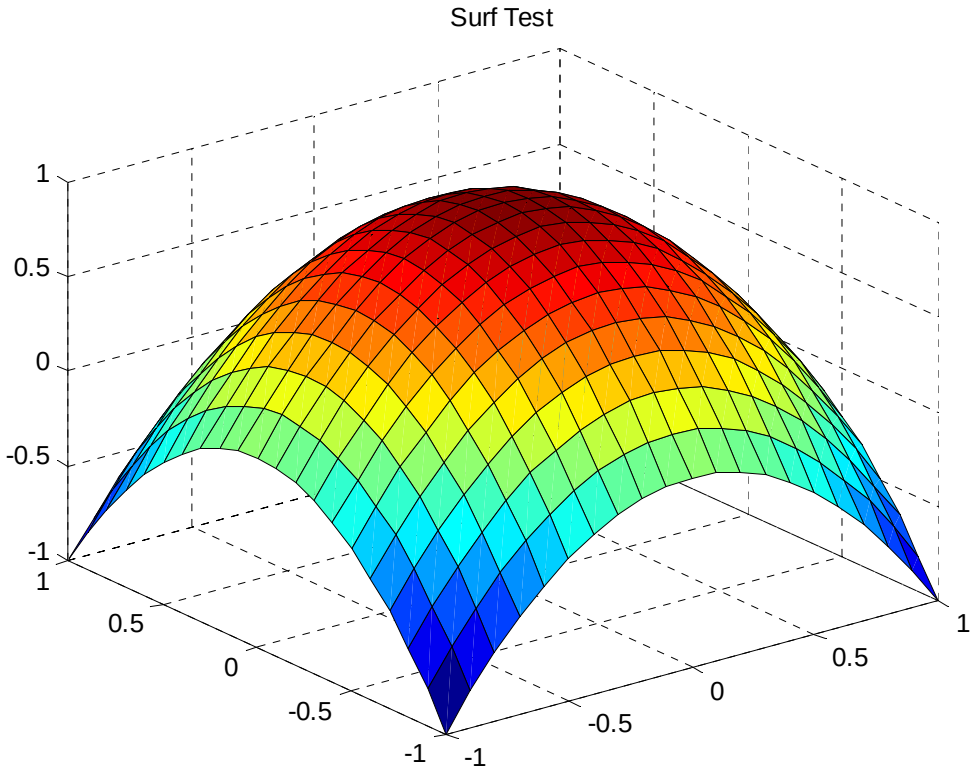
Command Window

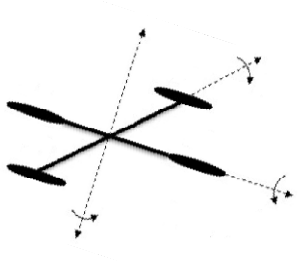
```
>> [X, Y] = meshgrid(-1:0.1:1);
>> Z = 1 - (X.^2 + Y.^2);
>> mesh(X,Y,Z); title('Mesh Test')
>>
```



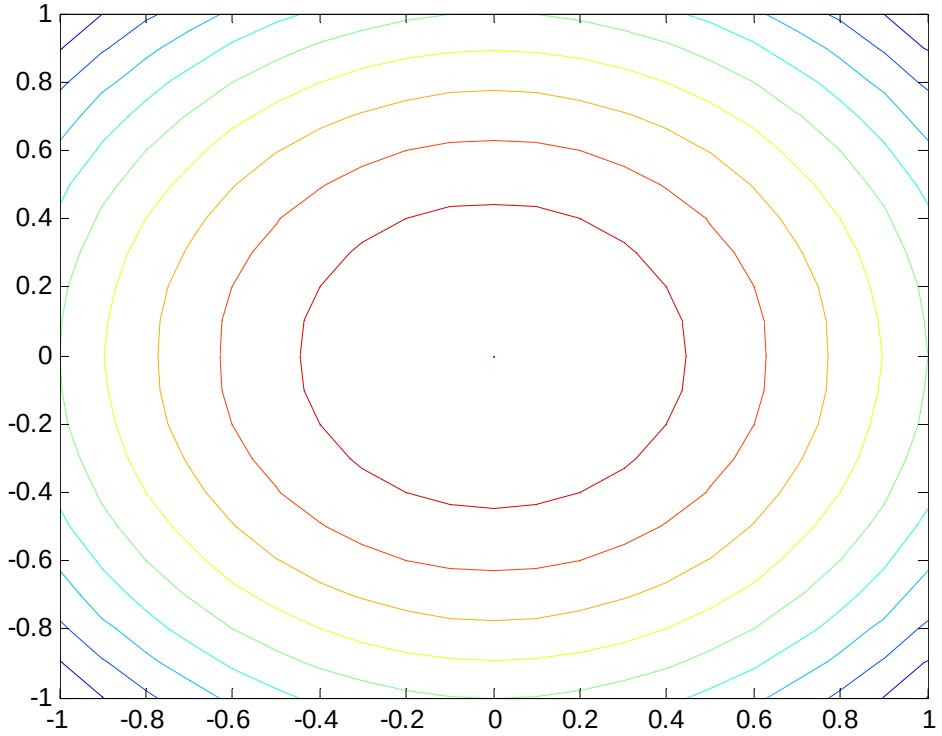


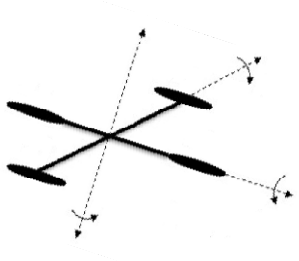
```
Command Window
>> [X, Y] = meshgrid(-1:0.1:1);
Z = 1 - (X.^2 + Y.^2);
surf(X,Y,Z); title('Surf Test')
>>
```





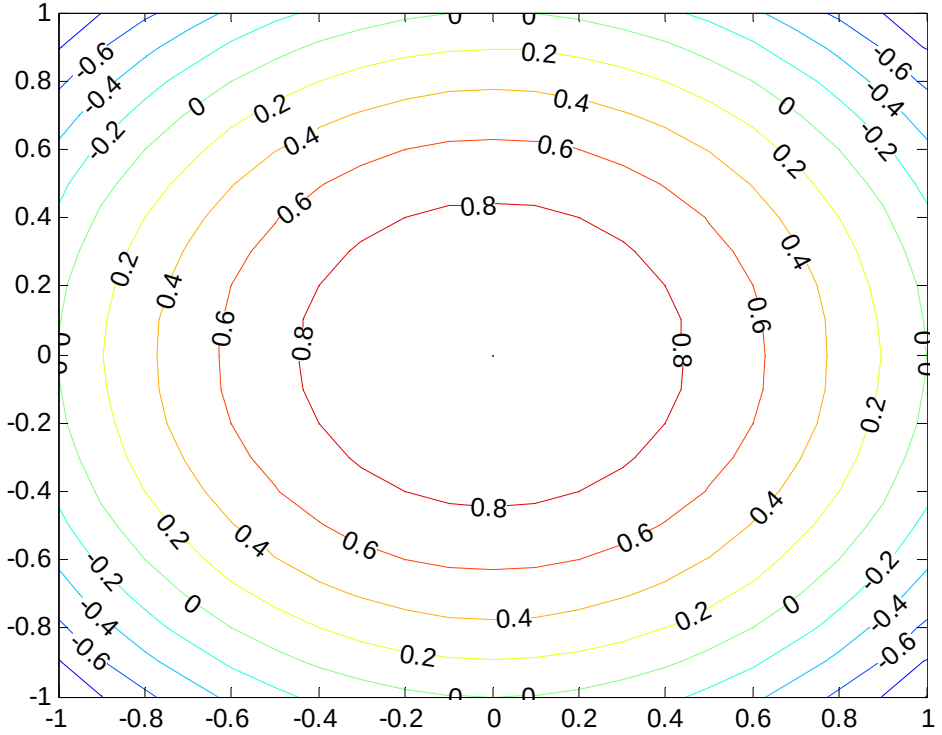
```
Command Window
>> [X, Y] = meshgrid(-1:0.1:1);
>> Z = 1 - (X.^2 + Y.^2);
>> contour(X,Y,Z)
fx >>
```

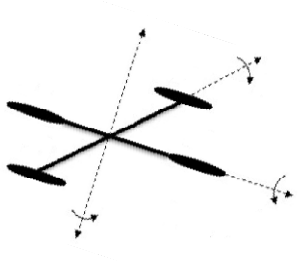




Command Window

```
>> [X, Y] = meshgrid(-1:0.1:1);
>> Z = 1 - (X.^2 + Y.^2);
>> [C, h] = contour(X,Y,Z);
>> clabel(C,h)
>>
```





```
Command Window
>> [X, Y] = meshgrid(-1:0.1:1);
>> Z = 1 - (X.^2 + Y.^2);
>> surfc(X,Y,Z)
>>
```