控制系統 HW1 106061226 施竣笙

1

輸入好 x matrix 與定義 I matrix，並輸入 function，得到 Z1

```
x = [2 1+2i;-0.45 5];
I = [1 0; 0 1]
z1 = 0.5* log(x + sqrt(1+x^2)) + I;
```

Ans:

```
z1 =

   1.7114 - 0.0253i   0.8968 + 0.3658i
   0.2139 + 0.9343i   2.1541 - 0.0044i
```

2

先輸入好 A、B matrix

```
A = [12 34 -4;34 7 87; 3 65 7];
B = [1 4 7; 2 5 8; 3 6 9];
```

輸入各對應的 function

```
%a
z2 = A * B;      %矩陣計算
%b
z3 = A .* B;     %對應element乘法
%c
z4 = A ^ 3;
%d
z5 = A .^ 3;
%e
z6 = [A([1,3],:);B^2];
%f
z7 = eig(B);
%g
z8 = det(A);
```

(a)

ANS:

```
z2 =

          68         194         320
         309         693        1077
         154         379         604
```

(b)

ANS:

```
z3 =

    12   136   -28
    68    35   696
     9   390    63
```

(c)

ANS:

```
z4 =

       37226      233824       48604
      247370      149188      600766
       78688      454142      118820
```

(d)

ANS:

```
z5 =

        1728       39304         -64
       39304         343      658503
          27      274625         343
```

(e)

ANS:

```
z6 =

    12    34    -4
     3    65     7
    30    66   102
    36    81   126
    42    96   150
```

(f)

ANS:

```
z7 =

   16.1168
   -1.1168
   -0.0000
```

(g)

ANS:

```
z8 =

      -75246
```

3

輸入好 y1 與 y2，x_val_1 代表有 0.52 的，x_val_2 代表有 0.53 的。

```
y1 = [1/2 1/3 1/4;1/3 1/4 1/5; 1/4 1/5 1/6];
y2 = [0.95; 0.67; 0.52];
y3 = [0.95; 0.67; 0.53];

x_val_1 = y1\y2;
x_val_2 = y1\y3;
```

ANS:

(1) 0.52(x_val_1):

```
x_val_1 =

    1.2000
    0.6000
    0.6000
```

(2) 0.53(x_val_2):

```
x_val_2 =

    3.0000
   -6.6000
    6.6000
```

4　9*9 Hilbert matrix

使用雙迴圈得到

```
%% 4
for i = 1:9
   for j = 1:9
      H(i,j) = 1/(i+j-1);
   end
end
```

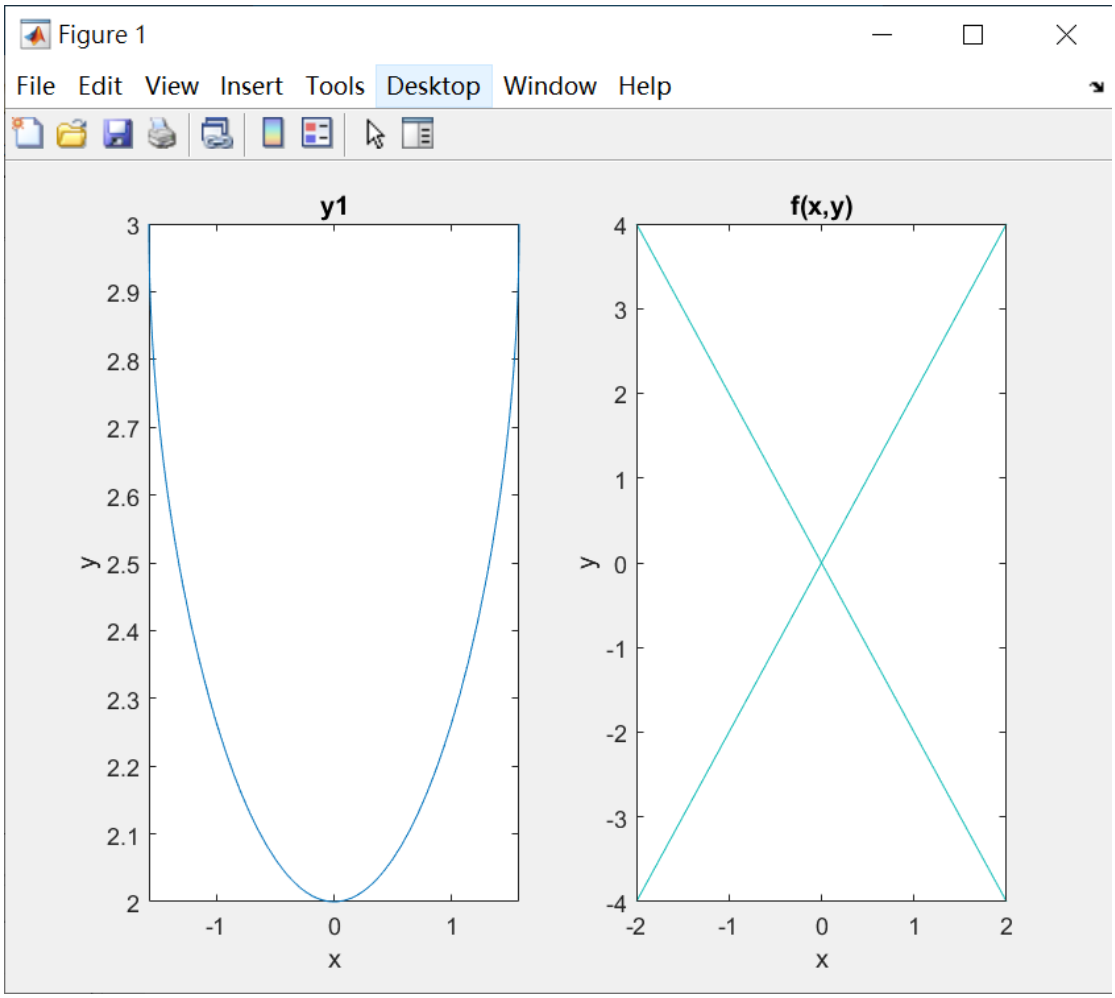
ANS:

```
H =

    1.0000    0.5000    0.3333    0.2500    0.2000    0.1667    0.1429    0.1250    0.1111
    0.5000    0.3333    0.2500    0.2000    0.1667    0.1429    0.1250    0.1111    0.1000
    0.3333    0.2500    0.2000    0.1667    0.1429    0.1250    0.1111    0.1000    0.0909
    0.2500    0.2000    0.1667    0.1429    0.1250    0.1111    0.1000    0.0909    0.0833
    0.2000    0.1667    0.1429    0.1250    0.1111    0.1000    0.0909    0.0833    0.0769
    0.1667    0.1429    0.1250    0.1111    0.1000    0.0909    0.0833    0.0769    0.0714
    0.1429    0.1250    0.1111    0.1000    0.0909    0.0833    0.0769    0.0714    0.0667
    0.1250    0.1111    0.1000    0.0909    0.0833    0.0769    0.0714    0.0667    0.0625
    0.1111    0.1000    0.0909    0.0833    0.0769    0.0714    0.0667    0.0625    0.0588
```

5

輸入好 function 並作圖

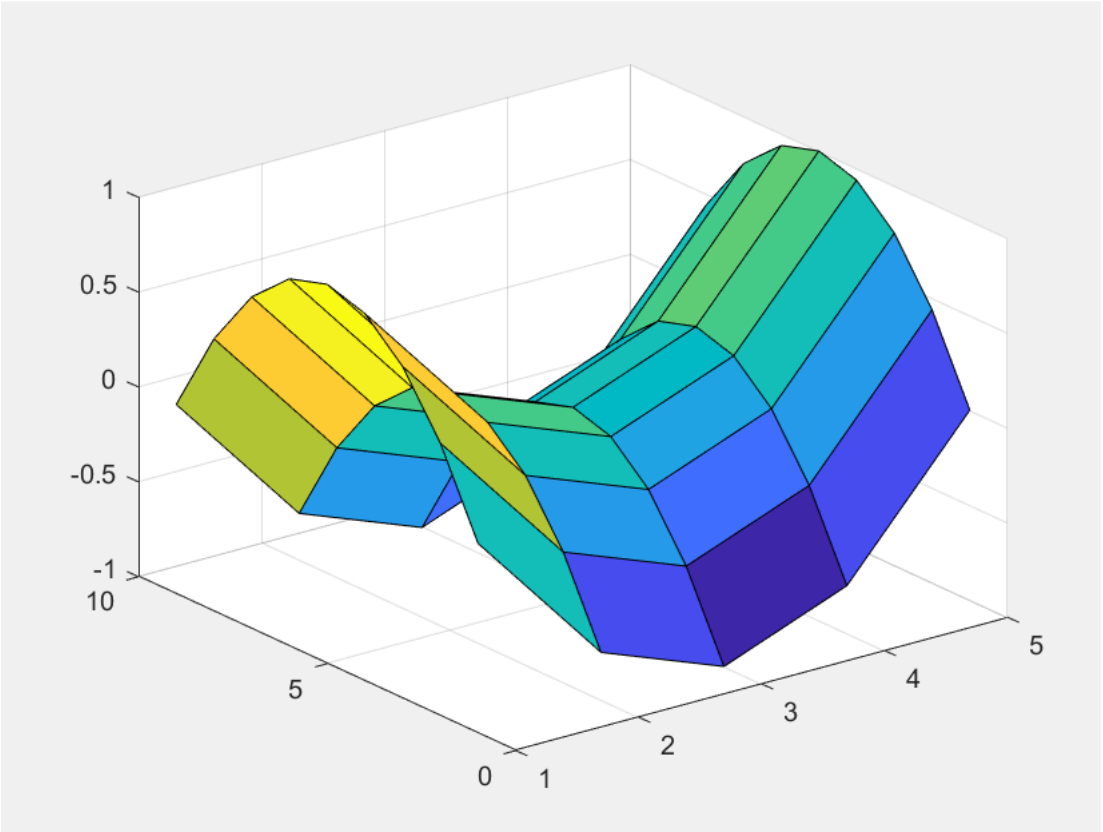
```
figure;
subplot(1,2,1);
fplot(@(x) -sqrt(cos(x)) + 3, [-pi/2, pi/2]);
title('y1');
xlabel('x');
ylabel('y');

subplot(1,2,2);
syms x y;
ezplot((x^2/4) - (y^2/16), [-2, 2, -4, 4]);
```



Or we can use

```
% 3D plot
figure;
x =[-2:2]  % value x range
y =[-4:4]  % value y range
[xm ym] = meshgrid(x,y)  % meshgrid: 2-D and 3-D grids
fxy =  (xm.^2)/4 - ((ym.^2)/16) % Your Function  fxy =f(x,y)
surf(fxy)   % surf : Surface plot
```

to get


1
0.5
0
-0.5
-1
10
5
0
1
2
3
4
5