繪圖軟體應用 第3周(9/25)

```
clear;clc
v1=[6 7 8 9]
```

```
v1 = 1×4
     6     7     8     9
```

```
v1([2,4])
```

```
ans = 1×2
     7     9
```

```
v1([2 4])
```

```
ans = 1×2
     7     9
```

```
v1(:)
```

```
ans = 4×1
     6
     7
     8
     9
```

```
v1(6) = 3  % 擴展元素數目
```

```
v1 = 1×6
     6     7     8     9     0     3
```

```
v1(end)
```

```
ans = 3
```

```
v1(3:5)=1
```

```
v1 = 1×6
     6     7     1     1     1     3
```

```
v1(1:2:end)
```

```
ans = 1×3
     6     1     1
```

```
v1(end:-1:1)
```

```
ans = 1×6
     3     1     1     1     7     6
```

```
M=[1 5 6 7; 1 5 6 7; 2 3 7 8];
M=[M,[44;77;88]]
```

```
M = 3×5
     1     5     6     7    44
     1     5     6     7    77
     2     3     7     8    88
```

```
M=[[8 9 10 11 12];M]
```

```
M = 4×5
     8     9    10    11    12
     1     5     6     7    44
     1     5     6     7    77
     2     3     7     8    88
```

```
M(4:-1:1,:)
```

```
ans = 4×5
     2     3     7     8    88
     1     5     6     7    77
     1     5     6     7    44
     8     9    10    11    12
```

索引值結構

```
M([5;7;9])
```

```
ans = 3×1
     9
     5
    10
```

```
M([1 3],[4 5])
```

```
ans = 2×2
    11    12
     7    77
```

索引值轉換

```
ind = sub2ind([3,4],2,3)  %第幾個元素
```

```
ind = 8
```

```
[row,col]=ind2sub([3,4],8)
```

```
row = 2
col = 3
```

```
[row2,col2]=ind2sub([3,4],[8 4 12])
```

```
row2 = 1×3
     2     1     3
col2 = 1×3
     3     2     4
```

三維陣列

```
A(:,:,1)=[7 8 9;10 11 12];
A(:,:,2)=[13 14 15; 16 17 18];
A
```

```
A =
A(:,:,1) =

     7     8     9
```

```
    10    11    12


A(:,:,2) =

    13    14    15
    16    17    18
```

陣列建立函數

```
c = eye(3)
```

```
c = 3×3
     1     0     0
     0     1     0
     0     0     1
```

```
diag([1 2 3 4])
```

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

亂數陣列

用途：

- 工業界濾波器，先知道一個函數，再產生雜訊合成，想辦法把雜訊濾掉
- 樂透電腦選號

```
randi(5,5) %1到5的5*5亂數矩陣
```

```
ans = 5×5
     5     1     1     4     1
     1     3     5     3     2
     2     4     2     1     2
     2     2     5     4     1
     1     4     5     3     1
```

```
randi(5,[3,2])
```

```
ans = 3×2
     5     3
     2     3
     5     2
```

```
randi([1,10],[3,2])
```

```
ans = 3×2
     1     3
    10     3
     1     6
```

```
rand()  %0到1之間均勻分布的亂數
```

```
ans = 0.8016
```

```
rand(3)
```

```
ans = 3×3
    0.5224    0.3576    0.1230
    0.7052    0.9211    0.2841
    0.8615    0.4339    0.7621
```

```
rand(3,4)
```

```
ans = 3×4
    0.5572    0.2737    0.4120    0.8692
    0.9170    0.6175    0.0631    0.7032
    0.9219    0.6799    0.8961    0.3547
```

```
randn() %平均值為0，標準差為1的常態分佈亂數
```

```
ans = 0.1795
```

```
randn(3) %平均值為0，標準差為1的常態分佈亂數
```

```
ans = 3×3
   -1.1849   -1.8861    0.0942
    1.0607   -1.7566    1.0617
    0.5829   -0.9368   -1.6830
```

```
randn(3,4) %平均值為0，標準差為1的常態分佈亂數
```

```
ans = 3×4
   -1.5308    0.0065    1.7878   -0.1861
    0.3491    0.5926   -0.7948    0.9384
   -0.0038   -0.5454    0.3750    1.3872
```

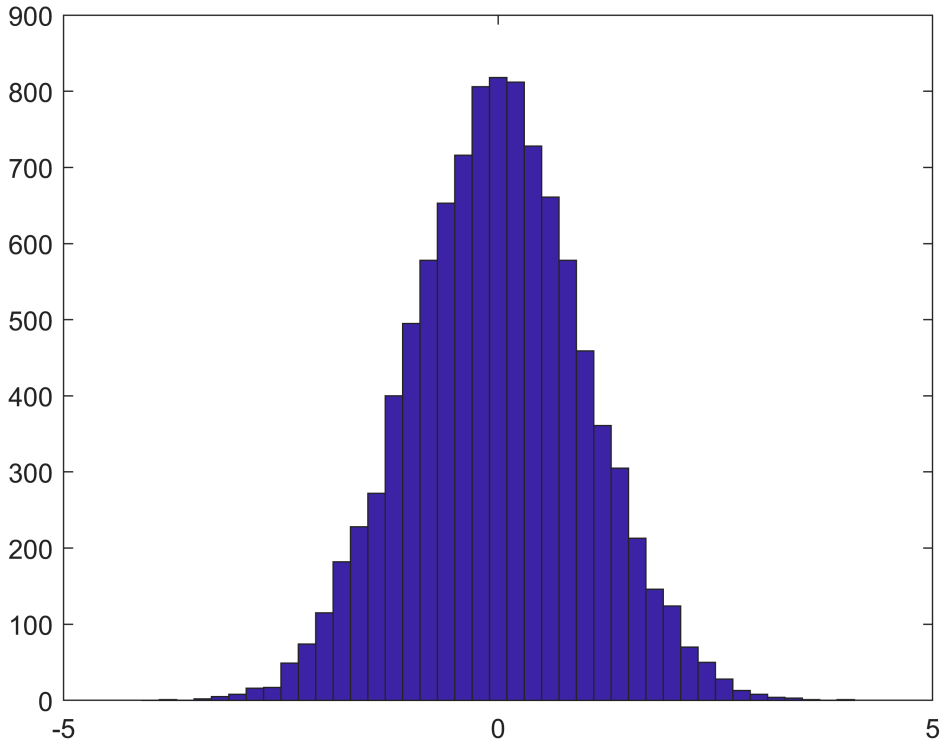
```
seed = 999
```

```
seed = 999
```

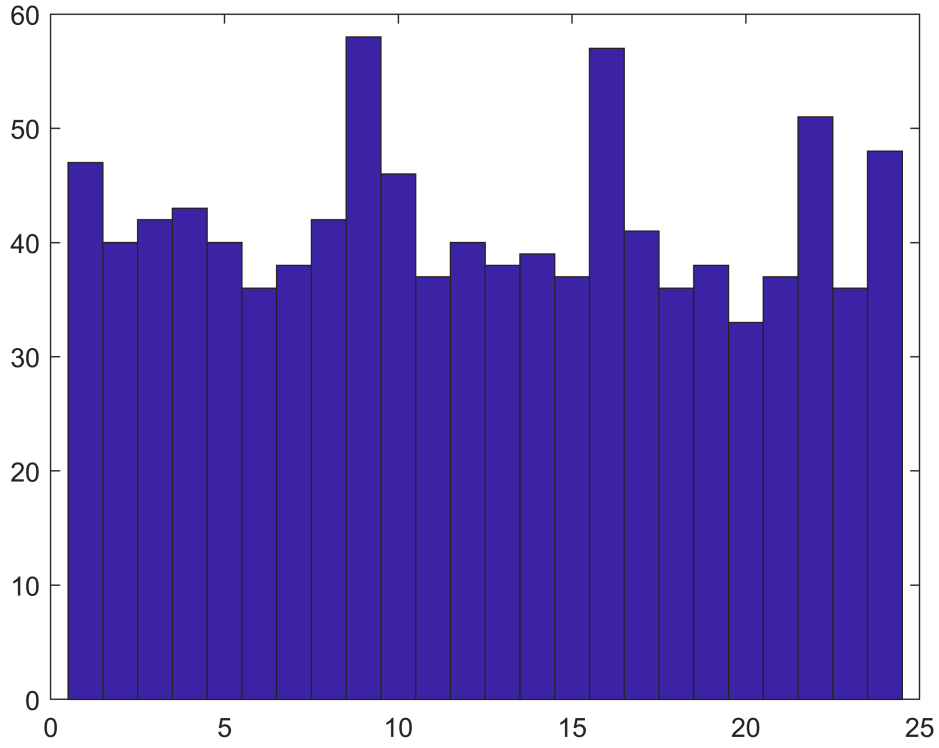
```
rng(seed) %設定亂數種子為seed
```

測試

```
B=randn(1,10000);          %常態分布
hist(B,-4:0.2:4)
```




```
C=randi([1,24],[1,1000]); %非常態分佈
hist(C,1:24)
```



陣列元素提取

```
diag(M)'
```

```
ans = 1×4
     8     5     6     8
```

```
diag(M,1)'    %第1個對角線
```

```
ans = 1×4
     9     6     7    88
```

```
diag(M,-1)'   %第-1個對角線
```

```
ans = 1×3
     1     5     7
```

```
triu(M)
```

```
ans = 4×5
     8     9    10    11    12
     0     5     6     7    44
     0     0     6     7    77
     0     0     0     8    88
```

```
triu(M,2)
```

```
ans = 4×5
     0     0    10    11    12
     0     0     0     7    44
     0     0     0     0    77
     0     0     0     0     0
```

```
tril(M)
```

```
ans = 4×5
     8     0     0     0     0
     1     5     0     0     0
     1     5     6     0     0
     2     3     7     8     0
```

```
tril(M,-2)
```

```
ans = 4×5
     0     0     0     0     0
     0     0     0     0     0
     1     0     0     0     0
     2     3     0     0     0
```

陣列元素重排

```
a=rand(3,4)
```

```
a = 3×4
    0.9514    0.8357    0.5076    0.2652
    0.5272    0.7025    0.7236    0.8001
    0.0930    0.8407    0.3566    0.0070
```

```
h = reshape(a,6,2)
```

```
h = 6×2
    0.9514    0.5076
    0.5272    0.7236
    0.0930    0.3566
    0.8357    0.2652
    0.7025    0.8001
    0.8407    0.0070
```

```
h1 = reshape(a,[6,2])
```

```
h1 = 6×2
    0.9514    0.5076
    0.5272    0.7236
    0.0930    0.3566
    0.8357    0.2652
    0.7025    0.8001
    0.8407    0.0070
```

```
rot90(M)
```

```
ans = 5×4
    12    44    77    88
    11     7     7     8
    10     6     6     7
     9     5     5     3
     8     1     1     2
```

```
d = magic(4)
```

```
d = 4×4
    16     2     3    13
     5    11    10     8
     9     7     6    12
     4    14    15     1
```

```
flipdim(d,2)  %flipdim(d,n)  以第n維度為中心翻轉
```

```
ans = 4×4
    13     3     2    16
     8    10    11     5
    12     6     7     9
     1    15    14     4
```

驚訝的結果(還好啦)

```
a=[1 2; 4 5]
```

```
a = 2×2
     1     2
     4     5
```

```
b = [4 5; 3 8]
```

```
b = 2×2
     4     5
     3     8
```

```
a+b
```

```
ans = 2×2
     5     7
```

```
     7    13
```

```
a-b
```

```
ans = 2×2
    -3    -3
     1    -3
```

```
a*b
```

```
ans = 2×2
    10    21
    31    60
```