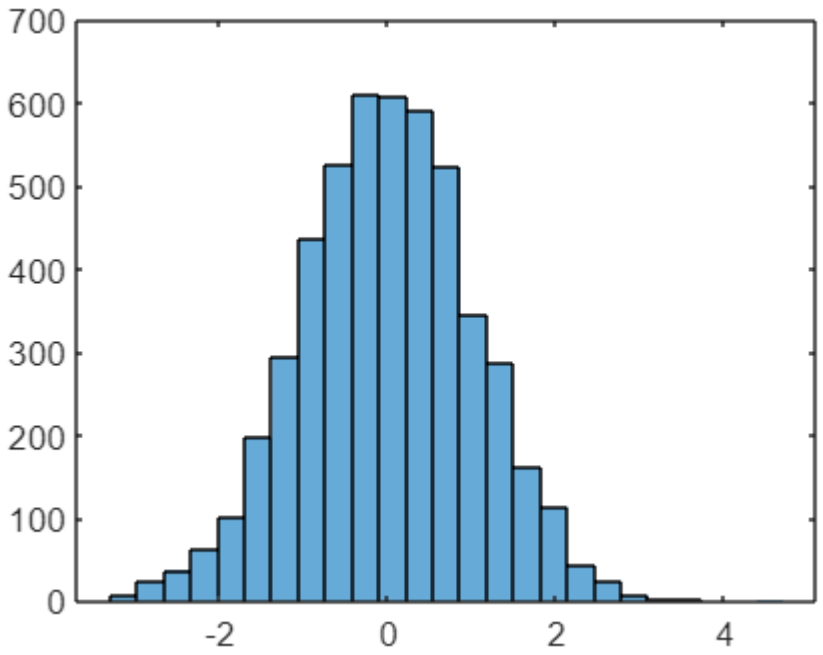
1.產生 5000 個正規分佈亂數，畫出分為 25 類的直方圖

- 觀察並回答當亂數個數改變時，圖形有何變化？ **(10 分)**
- 觀察並回答當分類個數改變時，圖形有何變化？ **(10 分)**

```
x=randn(5000,1)
```

```
x = 5000×1
    0.5371
   -0.4379
    0.3775
    0.4257
   -0.2261
    0.1465
    1.0498
    1.9296
   -0.3142
   -0.1509
      ⋮
```

```
histogram(x,25)
```

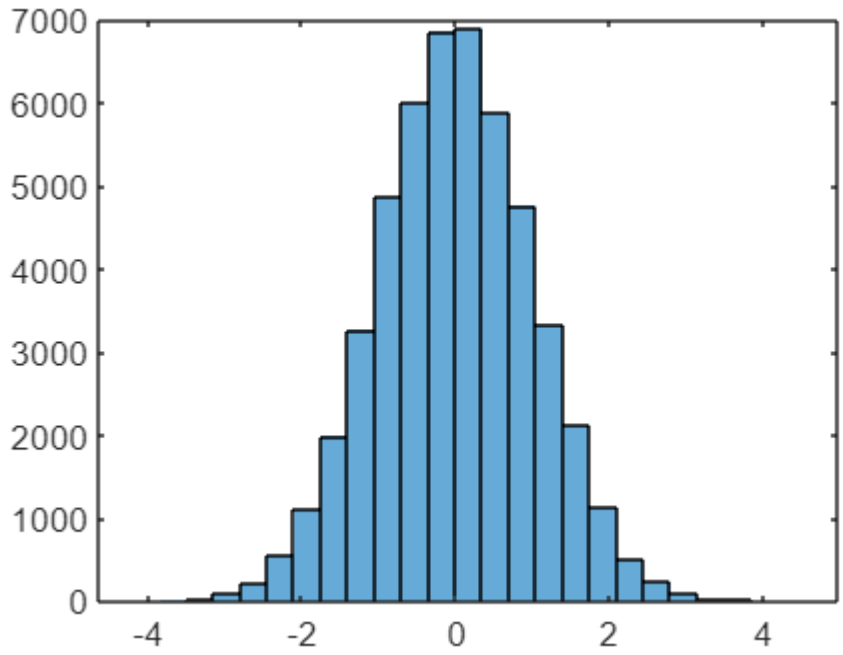



```
x=randn(50000,1)
```

```
x = 50000×1
    1.1826
   -1.8127
    0.7440
   -0.8784
    0.6655
    0.8463
    1.0996
    1.1163
   -0.0645
```

```
   -0.0131
     ⋮
```

```
histogram(x,25)
```

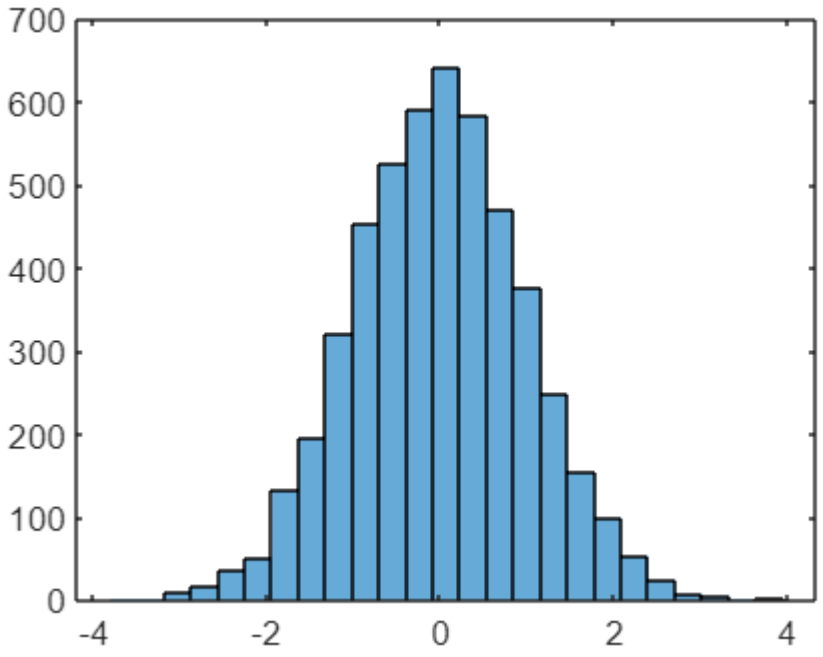



```
%%個數越來越接近常數分布

x=randn(5000,1)
```

```
x = 5000×1
   -0.0561
   -1.7670
   -0.8868
    0.9989
   -0.0151
   -0.8935
    2.0969
   -0.7719
    0.1002
    0.2098
     ⋮
```

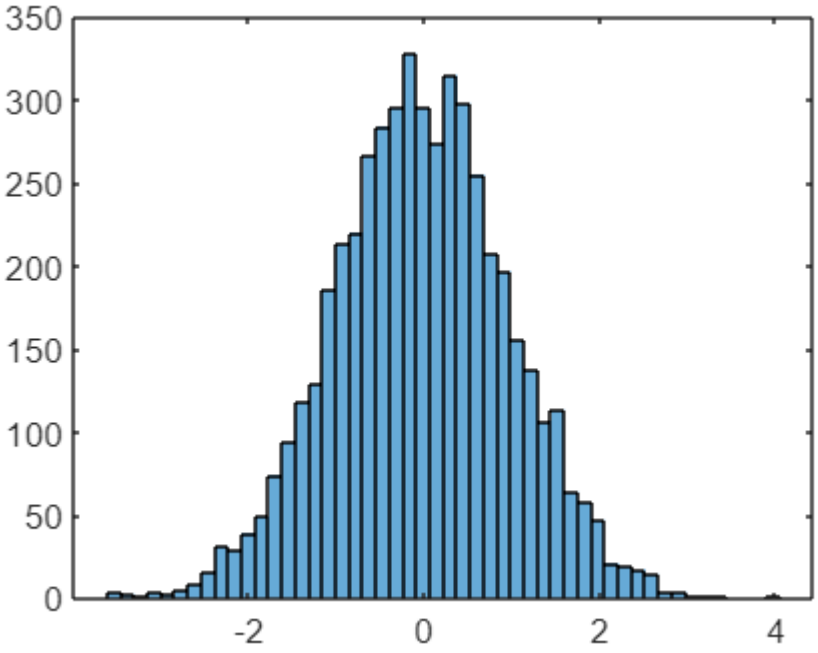
```
histogram(x,25)
```




```
x=randn(5000,1)
```

```
x = 5000×1
    1.0394
    1.3209
   -1.0051
    0.2904
   -2.3935
   -0.5653
   -0.3100
    0.5848
    0.6613
   -0.2048
      ⋮
```

```
histogram(x,50)
```




```
%%左右越來越細致
```

```

```

2.分別畫出正絃波的下列圖形，並在每個圖形中都加入 title, xlabel, ylabel, legend

- 連續圖形 (黑色虛線) **(7 分)**
- 階梯圖 (紅色直線) **(7 分)**
- 針狀圖 (綠色圓) **(7 分)**

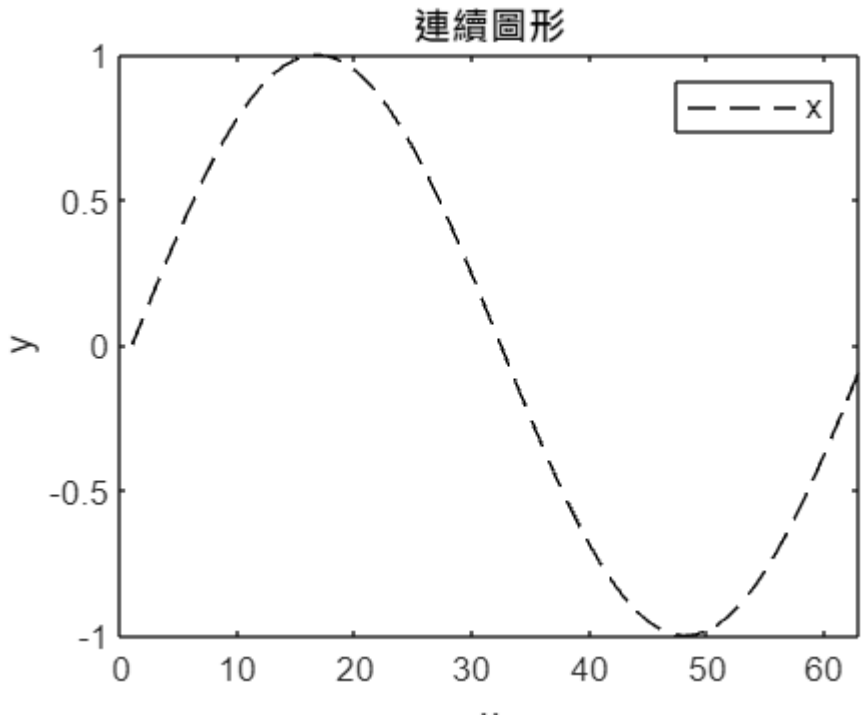
```
x=[0:0.1:pi*2]
```

```
x = 1×63
         0    0.1000    0.2000    0.3000    0.4000    0.5000    0.6000    0.7000 ···
```

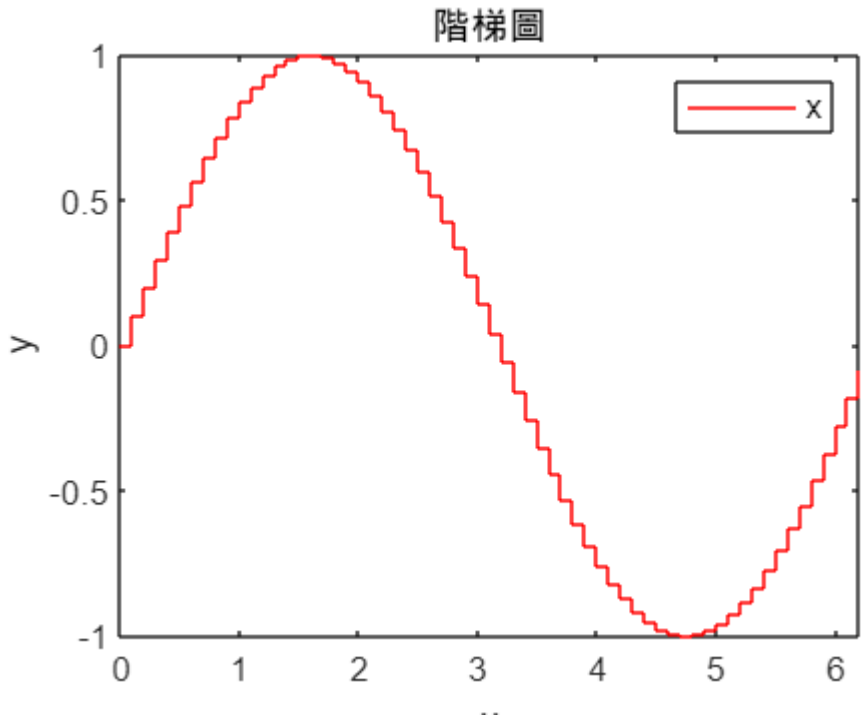
```
y=sin(x)
```

```
y = 1×63
         0    0.0998    0.1987    0.2955    0.3894    0.4794    0.5646    0.6442 ···
```

```
subplot(1,1,1),plot(y,'k--')
title("連續圖形")
xlabel("x")
ylabel('y')
legend('x')
```

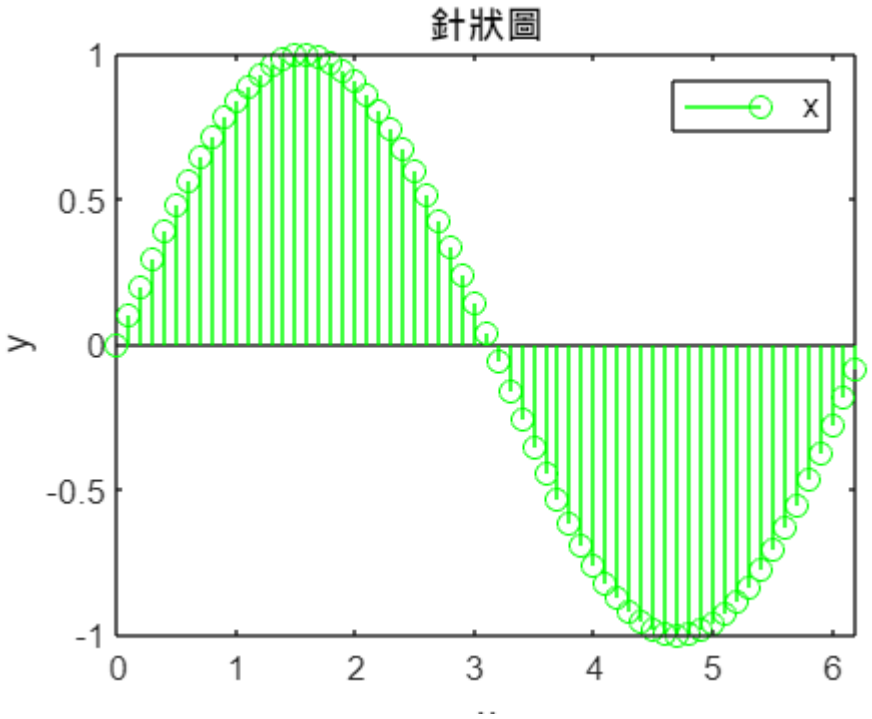



```
stairs(x,y,'r')
title("階梯圖")
xlabel("x")
ylabel('y')
legend('x')
```




```
stem(x,y,'g')
```

```
title("針狀圖")
xlabel("x")
ylabel('y')
legend('x')
```



3.參考講義，取樣頻率為 1000 Hz，產生兩個正弦波組成的訊號(a=1, b=2)並將白雜訊加入 **(20 分)**

- 利用 subplot 顯示出四種白雜訊係數 0, 0.5, 1, 2，並畫出前 50 個點的圖形

```
t=(0:0.001:1)
```

```
t = 1×1001
         0    0.0010    0.0020    0.0030    0.0040    0.0050    0.0060    0.0070 ···
```

```
a=1
```

```
a = 1
```

```
b=2
```

```
b = 2
```

```
y=a*sin(2*pi*50*t)+b*sin(2*pi*120*t)
```

```
y = 1×1001
         0    1.6781    2.5838    2.3500    1.2017   -0.1756   -1.0135   -0.8796 ···
```

```
vaa=0
```

```
vaa = 0
```

```
yn0=y+0*randn(size(t))
```

```
yn0 = 1×1001
         0    1.6781    2.5838    2.3500    1.2017   -0.1756   -1.0135   -0.8796 ···
```

```
yn1=y+0.5*randn(size(t))
```

```
yn1 = 1×1001
    0.1845    1.9837    3.1105    1.2387    0.9418   -0.4434   -1.3424   -0.3688 ···
```

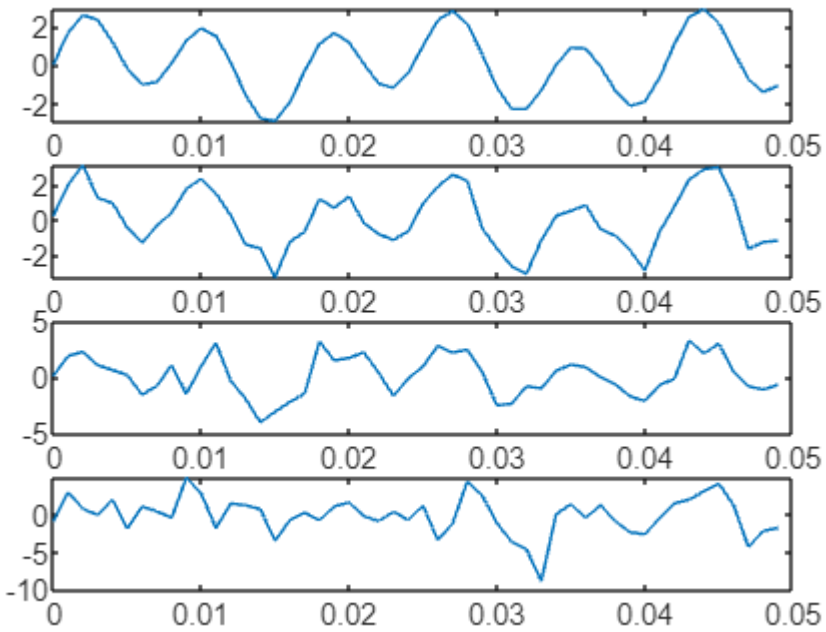
```
yn2=y+1*randn(size(t))
```

```
yn2 = 1×1001
    0.1254    1.9048    2.2843    1.0847    0.6527    0.2109   -1.5315   -0.7804 ···
```

```
yn3=y+2*randn(size(t))
```

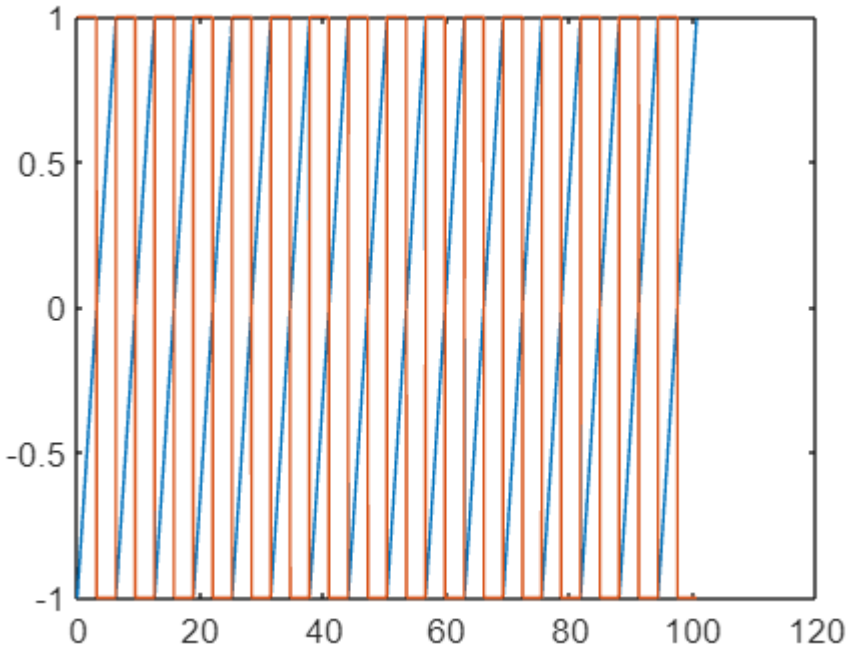
```
yn3 = 1×1001
   -0.9378    3.0048    0.7876   -0.0505    2.0041   -1.8766    1.0596    0.4626 ···
```

```
subplot(4,1,1),plot(t(1:50),yn0(1:50))
subplot(4,1,2),plot(t(1:50),yn1(1:50))
subplot(4,1,3),plot(t(1:50),yn2(1:50))
subplot(4,1,4),plot(t(1:50),yn3(1:50))
```



4.參考講義，在同一張圖畫出鋸齒波與方波，其中 2 秒內產生頻率為 40Hz，取樣速率為 10kHz **(20 分)**

```
subplot(1,1,1)
```




```
fs=10000
```

```
fs = 10000
```

```
d=0:1/fs:2
```

```
d = 1×20001
         0    0.0001    0.0002    0.0003    0.0004    0.0005    0.0006    0.0007 ···
```

```
a=2*pi*40*d
```

```
a = 1×20001
         0    0.0251    0.0503    0.0754    0.1005    0.1257    0.1508    0.1759 ···
```

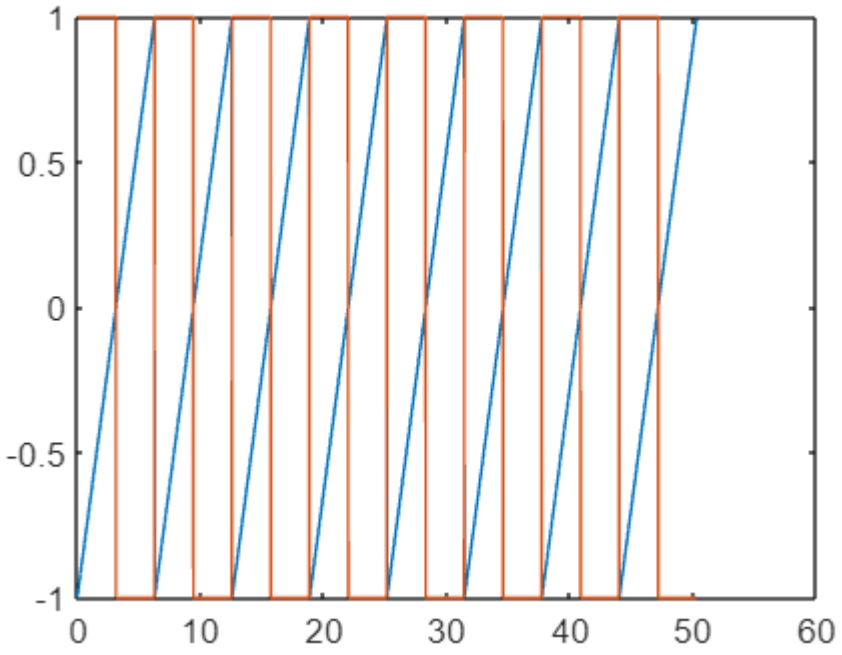
```
y1=sawtooth(a)
```

```
y1 = 1×20001
   -1.0000   -0.9920   -0.9840   -0.9760   -0.9680   -0.9600   -0.9520   -0.9440 ···
```

```
y2=square(a)
```

```
y2 = 1×20001
     1     1     1     1     1     1     1     1     1     1     1     1     1 ···
```

```
plot(a(1:2000),y1(1:2000),a(1:2000),y2(1:2000))
```



5.Generate “p_data1.txt” file, where the numerical values from data1.txt times 2. Next, follow the same procedure to generate “p_data2.txt”, where the header are preserved. **(20 分)**

```
load C:\Users\LIN20\OneDrive\桌面\matlab\data1.txt
x=data1()
```

```
x = 2536×2
    0.0158   -0.0001
    0.0315   -0.0000
    0.0473    0.0001
    0.0631   -0.0000
    0.0788    0.0000
    0.0946    0.0000
    0.1104    0.0000
    0.1261    0.0002
    0.1419    0.0010
    0.1577    0.0009
     ⋮
```

```
x=x*2
```

```
x = 2536×2
    0.0315   -0.0002
    0.0631   -0.0000
    0.0946    0.0003
    0.1261   -0.0000
    0.1577    0.0001
    0.1892    0.0000
    0.2208    0.0001
    0.2523    0.0004
    0.2838    0.0021
    0.3154    0.0019
     ⋮
```

```
save C:\Users\LIN20\OneDrive\桌面\matlab\p_data1.txt -ascii x

A = 'C:\Users\LIN20\OneDrive\桌面\matlab\data2.txt'
```

```
A =
'C:\Users\LIN20\OneDrive\桌面\matlab\data2.txt'
```

```
B = 'C:\Users\LIN20\OneDrive\桌面\matlab\p_data2.txt'
```

```
B =
'C:\Users\LIN20\OneDrive\桌面\matlab\p_data2.txt'
```

```


file2=fopen(B,'w')
```

```
file2 = 10
```

```


%save C:\Users\LIN20\OneDrive\桌面\matlab\p_data2.txt -ascii fil

fill = importdata(A)
```

```
fill = struct with fields:
          data: [6×1 double]
      textdata: {2×1 cell}
    colheaders: {'---Head2'}
```

```
c=string(fill.textdata)
```

```
c = 2×1 cell
'---Head1'
'---Head2'
```

```
b=fill.data*2
```

```
b = 6×1
   20.2000
    4.0000
   20.4000
   20.6000
   20.8000
   21.0000
```

```
fprintf(file2,'%s\n',c)
```

```
Error using fprintf
Function is not defined for 'cell' inputs.
```

```
fprintf(file2,'%f\n',b)

fclose(file2)
```