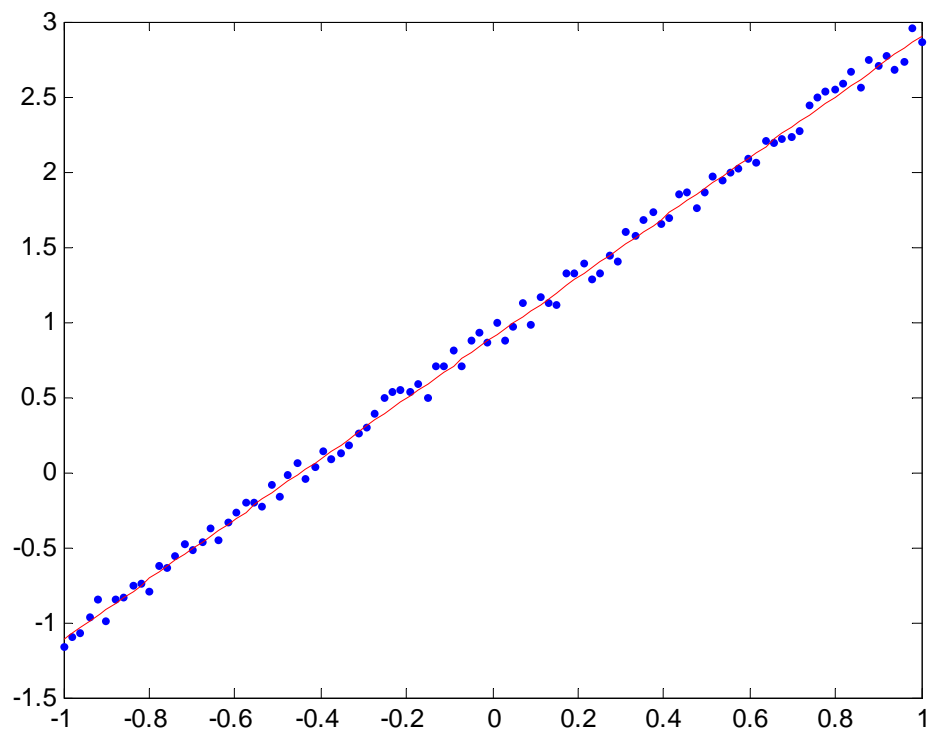


Exercise3

2007.03.27

1a&c.

```
x=linspace(-1,1,100);  
y=2*x+1-rand(1,100)*0.2;  
[a,b]=fitting(x,y);  
plot(x,y,'.');  
hold on;  
y_hat=a*x+b;  
plot(x,y_hat,'r');
```



1b.

```
function [a,b]=fitting(x,y)  
m=length(x);  
C(1,1)=sum(x.^2);C(1,2)=sum(x);  
C(2,1)=C(1,2);C(2,2)=m;  
d(1)=sum(x.*y);d(2)=sum(y);
```

```

g=inv(C)*d';
a=g(1);b=g(2);
return

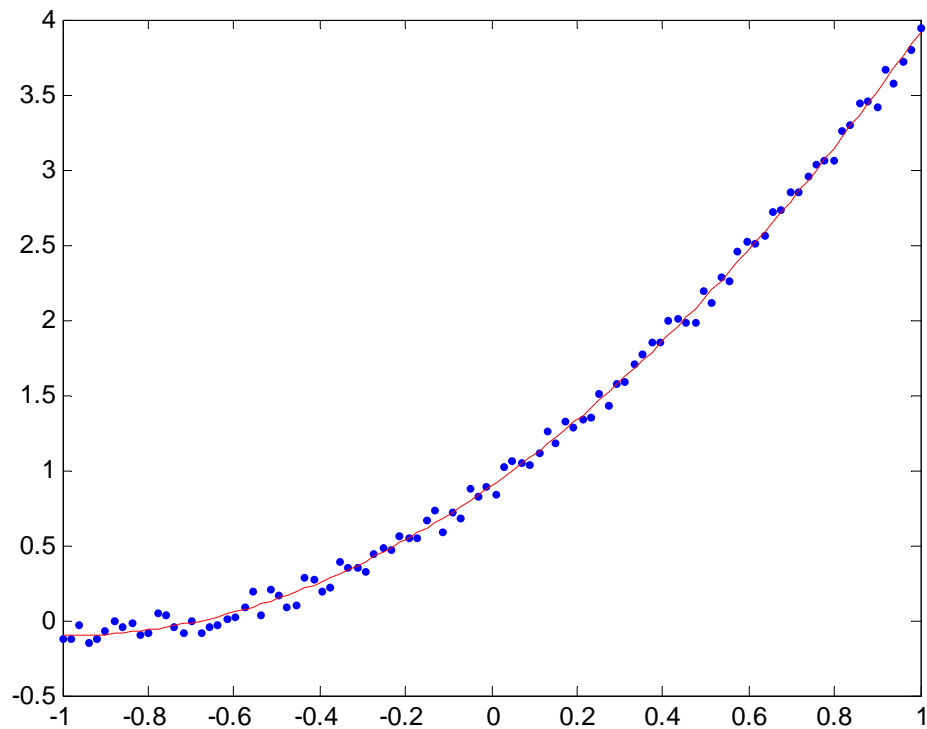
```

2a&d.

```

x=linspace(-1,1,100);
y=x.^2+2*x+1-rand(1,100)*0.2;
[a,b,c]=curve_fitting(x,y);
plot(x,y,'.');
hold on;
y_hat=a*x.^2+b*x+c;
plot(x,y_hat,'r');

```



2c.

```

function [a,b,c]=curve_fitting(x,y)
m=length(x);
C(1,1)=sum(x.^4);C(1,2)=sum(x.^3);C(1,3)=sum(x.^2);
C(2,1)=C(1,2);C(2,2)=C(1,3);C(2,3)=sum(x);
C(3,1)=C(1,3);C(3,2)=C(2,3);C(3,3)=m;
d(1)=sum(x.^2.*y);d(2)=sum(x.*y);d(3)=sum(y);
g=inv(C)*d';

```

```
a=g(1);b=g(2);c=g(3);
```

```
return
```

3.

```
X=rand(2,800)*2-1; % 3a
```

```
plot(X(1,:),X(2:),'g.')
```

```
hold on
```

```
S=X(1,:).*X(2:);
```

```
ind=find(X(1,:)<=0 & X(2:)>0);
```

```
XP=X(:,ind);
```

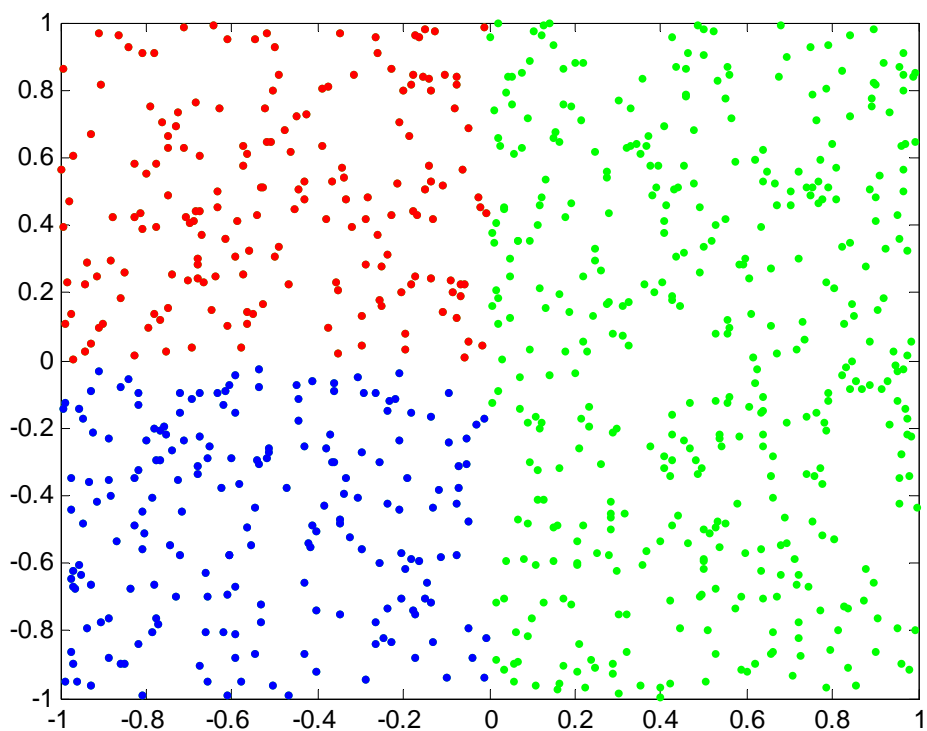
```
ind=find(X(1,:)<=0 & X(2:)<=0);
```

```
XN=X(:,ind);
```

```
plot(XP(1,:),XP(2:),'r.')
```

```
hold on;
```

```
plot(XN(1,:),XN(2:),'b.');
```



4.

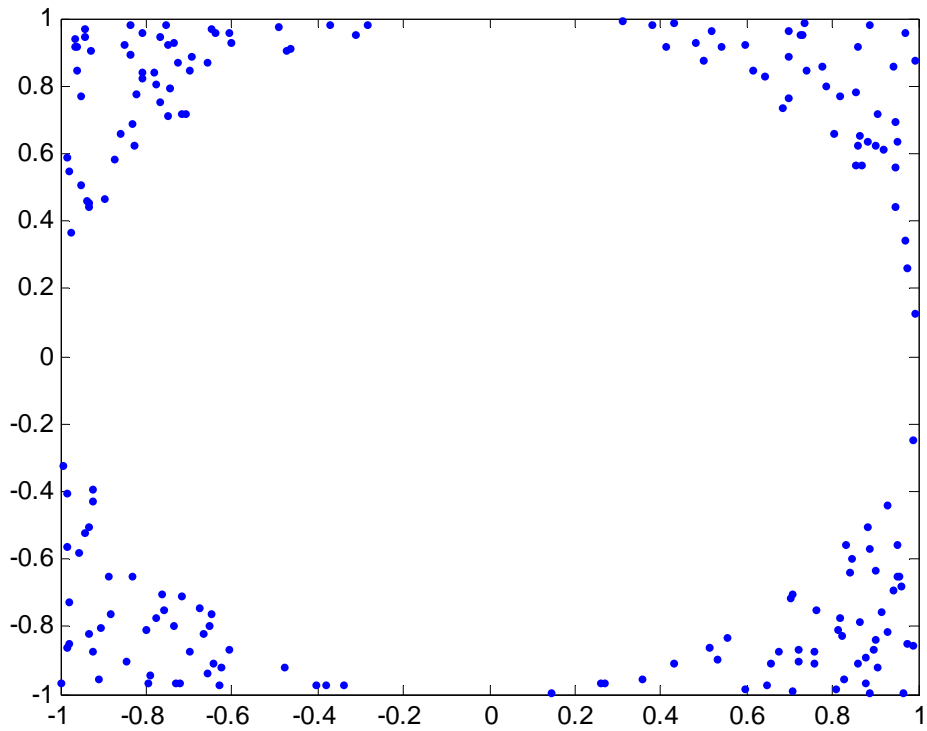
```
X=rand(2,800)*2-1; % 4a
```

```
D=sqrt(sum(X.^2));
```

```

ind=find(D>1);
XS=X(:,ind);
plot(XS(1,:),XS(2,:),'b');

```



5a.

```

function y=pw_linear(x)
y=x;
ind=find(x>3);
y(ind)=2;
ind=find(x<=3 & x>0);
y(ind)=x(ind)-1;
ind=find(x<=0);
y(ind)=-x(ind);
return

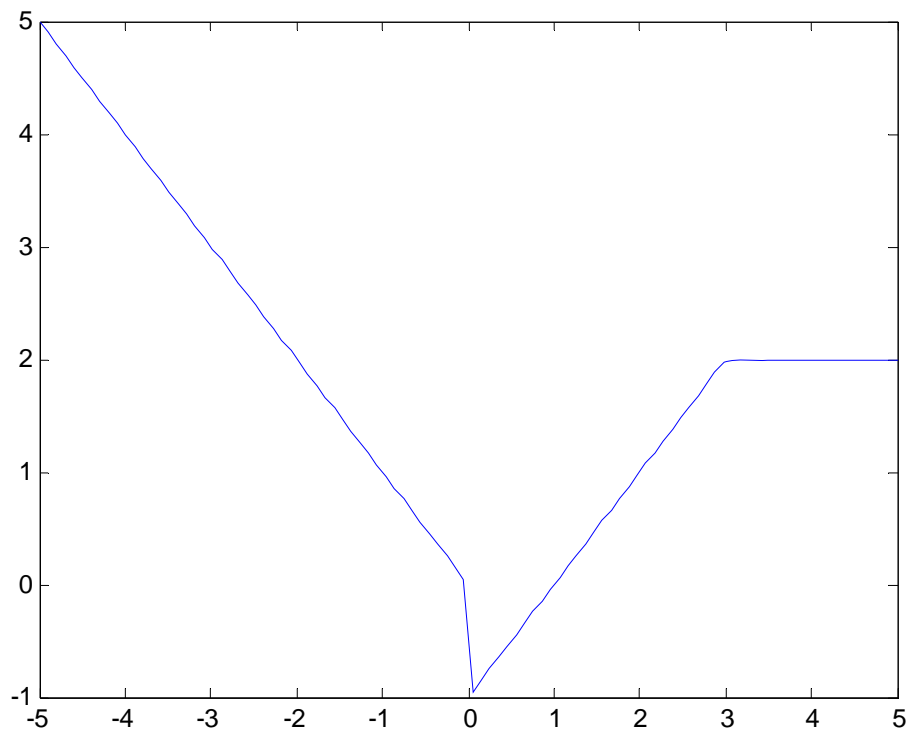
```

5b.

```

>> x=linspace(-5,5); y=pw_linear(x); plot(x,y)

```



6.

```
A1=reshape(randperm(9),3,3);  
A2=reshape(randperm(9),3,3);  
A3=reshape(randperm(9),3,3);  
A4=reshape(randperm(9),3,3);  
A5=reshape(randperm(9),3,3);  
A6=reshape(randperm(9),3,3);  
A7=reshape(randperm(9),3,3);  
A8=reshape(randperm(9),3,3);  
A9=reshape(randperm(9),3,3);  
A=[A1 A2 A3;A4 A5 A6;A7 A8 A9]
```