Logistic Regression(Classification)

1 Load the Data

```
x = load('ex4x.dat');
y = load('ex4y.dat');
```

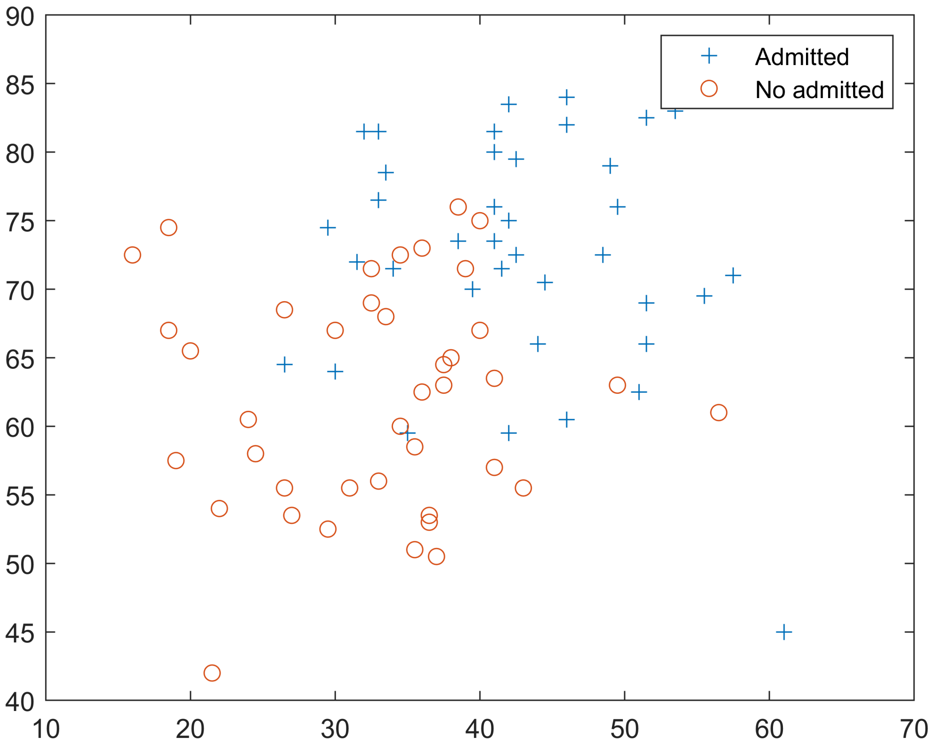
Load the data for the training examplings to programmer and add the x0=1 intercept term into the x matrix

```
n = length(x);
X = [ones(n,1), x];
```

2 Plot the data

Before beginning Newton's Method, we will first plot the data using different symbols to represent the two classes

```
%find returns the indices of the rows meeting the specified condition
pos = find(y==1);
neg = find(y==0);
% pos
% neg
% Assume the features are in the 2nd and 3rd coluns of x
plot(X(pos,2),X(pos,3),'+');
hold on
plot(X(neg,2),X(neg,3),'o')
legend('Admitted','No admitted')
hold off
```



数据维数注意

```
X(1,:)
```

```
ans = 1×3
    1.0000   55.5000   69.5000
```

```
[n,m]=size(transpose(X))
```

```
n = 3
m = 80
```

3 Newton method

```
% 基本参数
iterMax = 8;
[theta,J] = Newton_model(X,y,iterMax)
```

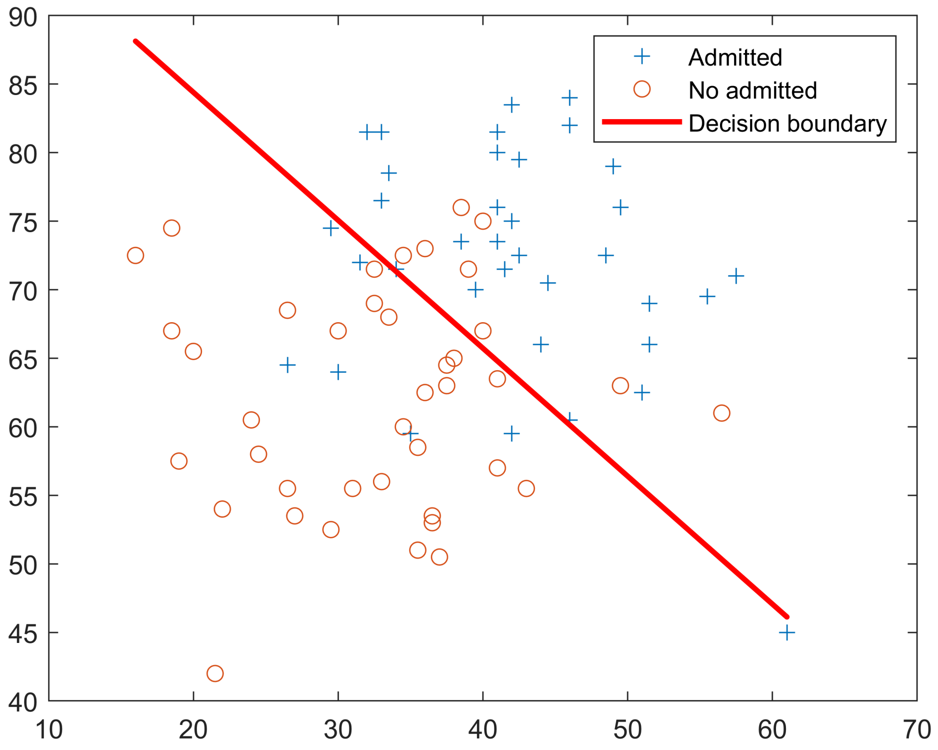
```
theta = 3×1
  -16.3787
    0.1483
    0.1589
J = 8×1
    0.6931
    0.4409
    0.4089
    0.4055
    0.4054
    0.4054
    0.4054
    0.4054
```

Plot the Decision boundary

```
y = (-1/theta(3)).*(theta(2).*X(:,2)+theta(1))
```

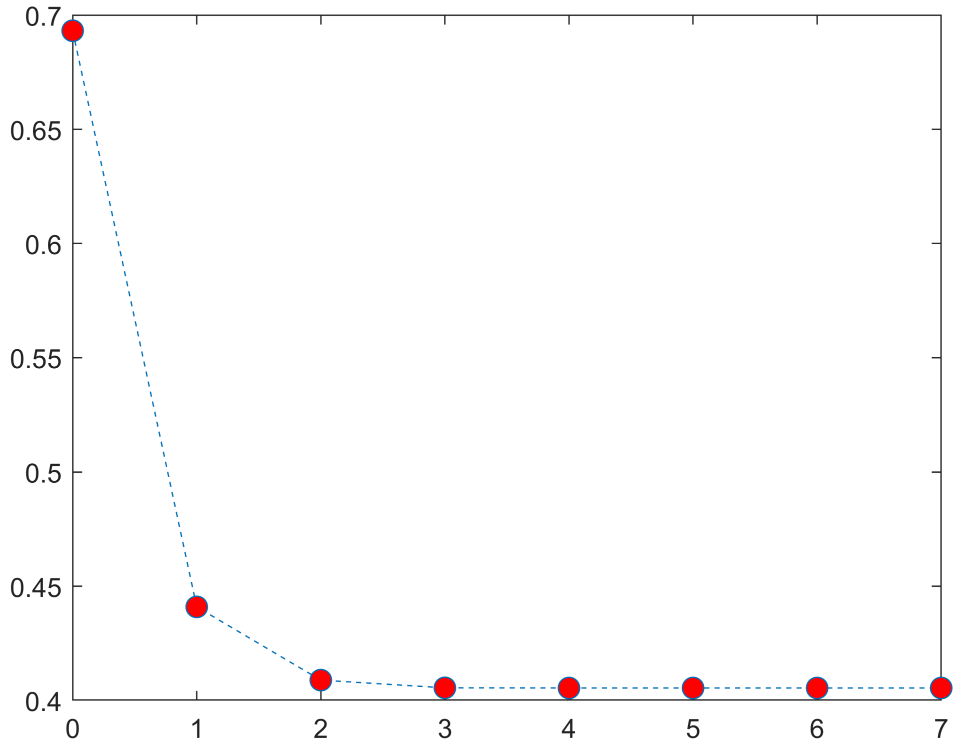
```
y = 80×1
   51.2612
   64.7969
   53.1281
   60.1294
   64.7969
   54.9951
   55.4619
   63.8634
   53.1281
   49.3942
     ⋮
```

```
plot(X(pos,2),X(pos,3),'+');
hold on
plot(X(neg,2),X(neg,3),'o')
plot(X(:,2),y,'r','LineWidth',2)
legend('Admitted','No admitted','Decision boundary')
hold off
```



Plot the J(\theta)

```
x_j = 0:iterMax-1;
plot(x_j,J,'o--', 'MarkerFaceColor', 'r', 'MarkerSize', 8)
```


0.7
0.65
0.6
0.55
0.5
0.45
0.4
0
1
2
3
4
5
6
7