# 基于最小二乘法的回归线性方程解法

2018年4月22日 19:47

```
def get_a(x):
    a = 0.0
    for i in x:
        a = a + (i * i)
    return a

def get_b(x):
    a = 0.0
    for i in x:
        a = a + i
    return a

def get_c(x, y):
    a = 0.0
    for i in range(len(x)):
        a = a + x[i] * y[i]
    return a

def get_d(y):
    a = 0.0
    for i in y:
        a = a + i
    return a
```

$$\sum X_i^2$$

$$\sum X_i$$

$$\sum X_i Y_i$$

$$\sum Y_i$$

```
def print_list(ilist):
    for i in ilist:
        print(i, ",", end="")
    print("\n")
```

打印数据

```
#等式计算
A = get_a(listx)
B = get_b(listx)
C = get_c(listx, listy)
D = get_d(listy)
n = len(listx)
a = (B*D-C*n)/(B*B-n*A)
b = (B*C-D*A)/(B*B-n*A)
print_list(listx)
print_list(listy)
plt.scatter(listx, listy)
plt.plot(x, a * x + b, 'g-')#绘制线条
```

$$\hat{\beta}_2 = \frac{n\sum X_i Y_i - \sum X_i \sum Y_i}{n\sum X_i^2 - (\sum X_i)^2}$$

$$\hat{\beta}_1 = \frac{\sum X_i^2 \sum Y_i - \sum X_i \sum X_i Y_i}{n\sum X_i^2 - (\sum X_i)^2}$$