学習記録 ¶

In [ ]:

最小二乗法は誤差関数の傾きを最小にする方法
aについて偏微分、bについて偏微分したものの連立方程式をとれば解が出る
二乗を取るのは値をせいにする為

In [154]:

```
import numpy as np
import pandas as pd
#%matplotlib inline
import matplotlib.pyplot as plt
```

演習

In [129]:

```
df = pd.read_csv("Week6Exercise1.csv", header=None)
```

In [130]:

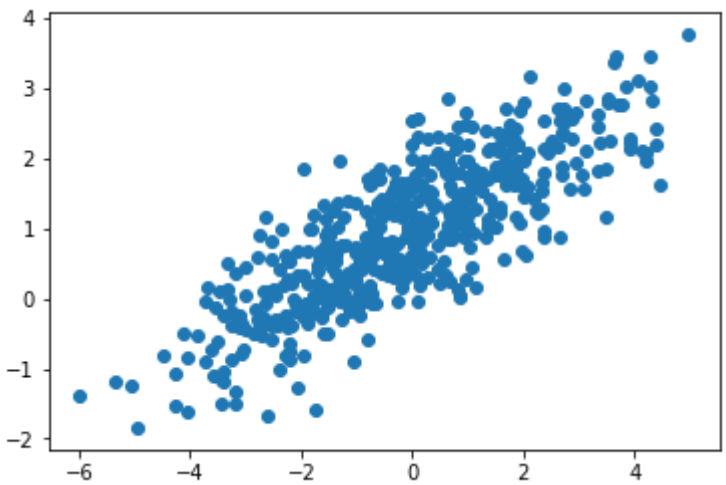
```
df.head()
x =np.array(df.loc[:, [0]])
y = np.array(df.loc[:,[1]])
```

In [131]:

```
plt.scatter(x, y)
```

Out[131]:

<matplotlib.collections.PathCollection at 0x1a2990f470>



In [132]:

```
print(x.mean())
print(np.std(x))
print(y.mean())
print(np.std(y))
```

```
-0.12187808410605419
1.9749213418471876
0.9499441282173267
1.0304480101175666
```

In [133]:

```
# 線形回帰モデルのクラスを読み込み
from sklearn.linear_model import LinearRegression

# 線形回帰のインスタンスを生成
lr = LinearRegression()
```

In [134]:

```
lr.fit(x,y)
```

Out[134]:

```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=1, normalize=False)
```

In [146]:

```
xdev = x-x.mean()
ydev = y-y.mean()
xvar  = np.var(x)
yvar = np.var(y)
xstd = np.std(x)
ystd = np.std(y)
```

In [140]:

```
xystd = ystd / xstd
xystd
```

Out[140]:

```
0.5217666082608464
```

In [150]:

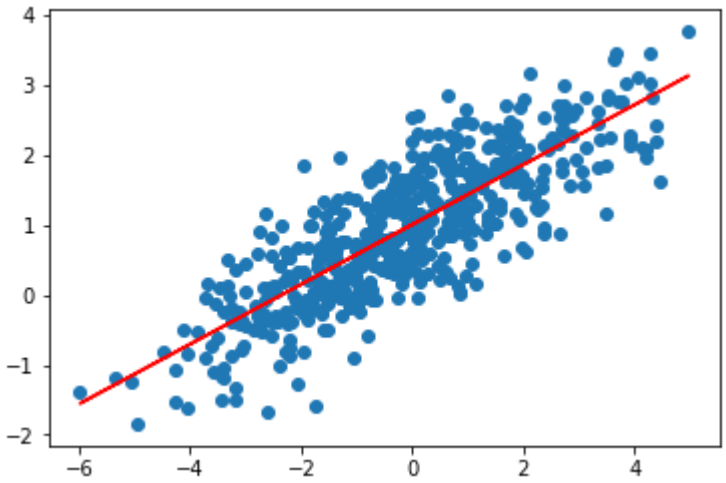
```
a = lr.intercept_ #a
```

In [151]:

```
b = lr.coef_ #b
```

In [96]:

```
# 散布図に近似直線を重ねてみる
plt.scatter(xvec, yvec)                    # 散布図を表示
plt.plot(xvec, lr.predict(xvec), color='red') # 回帰直線を表示
plt.show()                                 # 上記の内容でグラフを表示
```



In [148]:

```
def sqrdiff(xvec, yvec, a,b):
    rss = np.square(yvec - (a + b * xvec)).sum()
    return rss
```

In [152]:

```
sqrdiff(xvec, yvec, a, b)
```

Out[152]:

175.0943749100058

In [153]:

```
def find_min(xvec, yvec,a=1)
     rss = np.square(yvec - (a + b * xvec)).sum()
```

(0.5000000000000002, -0.25)

In [ ]:

```
def find_min(a,b):
    if(a>b):
        a,b = b,a
    step = 0.01
    x = a
    min = x*(x-1)
    argmin = x
    while(x < b):
        v = x*(x-1)
        if (v < min):
            min = v
            argmin = x
        x += step
    return argmin,min

print(find_min(-1.0,1.0))
```