**SAMPLE-1**

**ITERATION-1**

**step:1** - [7.6,157],eta=0.01,m=1,c=-1

**step-2**  - de/dm|m = 1 ===> -(y-mx-c)\*(-x)

= 1143.04

de/dc|c = -1 ==> -(y-mx-c)

= -150.4

**step-3** - delta(m) = -eta(de/dm) = -(0.01)(1143.04)

= -11.430

delta(c) = -eta(de/dc) = -(0..01)(-150.4)

= 1.504

**step-4** - m = m+delta(m) = 1+(11.43) = -10.43

c = c+delta(c) = -1+(1.504) = 0.504

**ITERATION-2**

**step:1** - [7.6,157], eta = 0.01, m = -10.43, c = -0.504

**step-2** - de/dm|m = -10.43 ===> -(y-mx-c)\*(-x)

= 1794.955

de/dc|c = 0.504 ==> -(y-mx-c)

= -235.868

**step-3** - delta(m) = -eta(de/dm) = -17.949

delta(c) = -eta(de/dc) = 2.358

**step-4** - m = m+delta(m) = -28.379

c = c+delta(c) = 2.868

**SAMPLE-2**

**ITERATION-1**

**step:1** - [7.1,174], eta = 0.01, m = 1, c = -1

**step-2** - de/dm|m = 1 ===> -(y-mx-c)\*(-x)

= 1192.09

de/dc|c = -1 ==> -(y-mx-c)

= -167.9

**step-3** - delta(m) = -eta(de/dm) = -11.920

delta(c) = -eta(de/dc) = 1.679

**step-4** - m = m+delta(m) = 1+(11.43) = -10.920

c = c+delta(c) = -1+(1.504) = 0.679

**ITERATION-2**

**step:1** - [7.6,157], eta = 0.01, m = -10.920, c = -0.679

**step-2** - de/dm|m = -10.43 ===> -(y-mx-c)\*(-x)

= 1781.056

de/dc|c = 0.504 ==> -(y-mx-c)

= -250.853

**step-3** - delta(m) = -eta(de/dm) = -17.810

delta(c) = -eta(de/dc) = 2.508

**step-4** - m = m+delta(m) = -28.73

c = c+delta(c) = 3.187

**PYTHON CODE**

import pandas as pd

import numpy as np

data=pd.read\_csv('groundwater\_survey.csv')

data.skew()

log\_X=np.log(np.log(np.log(data['X'])))

log\_X.skew()

print(data)

x\_train=data.iloc[0:30,0]

y\_train=data.iloc[0:30,0]

x\_test=data.iloc[30:34,1]

y\_test=data.iloc[30:35,1]

x\_train=x\_train.iloc[1:].values

x\_train=x\_train.reshape(len(x\_train),1)

y\_train=y\_train.iloc[1:].values

y\_train=y\_train.reshape(len(y\_train),1)

x\_test=x\_test.iloc[1:].values

x\_test=x\_test.reshape(len(x\_test),1)

y\_test=y\_test.iloc[1:].values

y\_test=y\_test.reshape(len(y\_test),1)

def slr\_sgd(x,y,epochs):

    length=len(x)

    i=0

    j=0

    m=[1]\*(length)

    c=[1]\*(length)

    a1=[]

    a2=[]

    y\_pre=[]

    while(j<epochs):

        while(i<length):

            k=(y[i]-(m[i]\*x[i])-c[i])

            dm=-0.01\*(k\*x[i])

            dc=-0.01\*k

            m[i]=m[i]+dm

            c[i]=c[i]+dc

            a1.append(m[i])

            a2.append(c[i])

            i=i+1

        j=j+1

    return a1,a2

m,c=slr\_sgd(x\_train,y\_train,2)

print(m)

print(c)

i=0

y\_pred=[]

while i<29:

    y\_predict=(m[i]\*x\_train[i])-c[i]

    y\_pred.append(y\_predict)

    i=i+1

print(y\_pred)

import math

from sklearn.metrics import mean\_squared\_error

from sklearn.metrics import mean\_absolute\_error

def accuracy\_op(y\_train,y\_pred):

    mse = math.sqrt(mean\_squared\_error(y\_train,y\_pred))

    print('Root mean square error', mse)

    mse = (mean\_squared\_error(y\_train,y\_pred))

    print('Mean square error', mse)

    mae=mean\_absolute\_error(y\_train, y\_pred)

    print('Mean absolute error', mae)

print(accuracy\_op(y\_train,y\_pred))

m1,c1=slr\_sgd(x\_test,y\_test,2)

print(m1,c1)

i=0

yt\_pred=[]

while i<3:

    yt\_predict=(m1[i]\*x\_test[i])-c1[i]

    yt\_pred.append(yt\_predict)

    i=i+1

print(yt\_pred)

print(accuracy\_op(y\_test,yt\_pred))