```python
# -*- coding: utf-8 -*-

import numpy as np
import matplotlib.pyplot as grafik
from matplotlib.pyplot import plot
def sigmoid(x):
    y=1/(1+np.exp(-x))
    return y

# SGD (online training)
#VERI SETI ---------------------------------------------
#X=np.array([-2,-1.5,-1,-0.5, 0,0.5,1,1.5,2],dtype='f')
X=np.linspace(-2,2,9)
#T=np.array([0, 0.075,0.292,0.617,1.0, 1.382,1.707,1.923,2])
T=1+np.sin(X*np.pi/4)
#Başlangıç değerleri
W1=np.random.rand(2,1)
b1=np.random.rand(2,1)
W2=np.random.rand(1,2)
b2=np.random.rand(1)

alfa=0.3#öğrenme oranı(learning rate)
epoch=10

hataMSE=np.empty(epoch)
for k in range(epoch):#Eğitim setinin kaç tur dolaşılacağını belirler

    for i in range(X.size):
        #print(i)
        #1. katman
        y1=sigmoid( W1*X[i]+b1)
        #2. katman
        y2=np.matmul(W2,y1)+b2 #W2*y1, linear: f(n)=n
        #hata
        e=T[i]-y2

        #GERI YAYILIMF2=[1];
        F2=1
        d2=-2*F2*e

        # 2. Katmandaki parametreler
        W2=W2-alfa*d2*y1.reshape(1,2) #y1'
        b2=b2-alfa*d2


        F1=np.array([[ (1-y1[0])*y1[0] , 0],
                     [0 , (1-y1[1])*y1[1]] ],dtype='float32')

        d1= np.matmul(F1, W2.reshape(2,1))*d2
         #1. Katmandaki parametreler
        W1=W1-alfa*d1*X[i] #X(i)'
        b1=b1-alfa*d1


    #Doğruluk testi
    hata=0
    for i in range(len(X)):
        #1. katman
        Y1=sigmoid( W1*X[i]+b1)
        #2. katman
        Y2=np.matmul(W2,Y1)+b2 #linear
        hata= hata+(T[i]-Y2)**2

    MSE=hata/len(X)
    print("MSE=",MSE)
    hataMSE[k]=MSE

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```
68  grafik.figure(0)
69  grafik.plot(range(epoch),hataMSE,'ro')
70  grafik.xlabel("iterasyon")
71  grafik.ylabel("MSE")
72  print("W1=",W1,"\nW2",W2)
73  print("b1=",b1,"\nb2",b2)
74
75  #Eğitilmiş ağın çıkışını diziye yaz
76  Y=np.empty(len(X))
77  for i in range(len(X)):
78      #1. katman
79      Y1=sigmoid( W1*X[i]+b1)
80      #2. katman
81      Y[i]=np.matmul(W2,Y1)+b2 #linear
82
83  #Karşılaştır
84  grafik.figure(1)
85  plot(X,Y,'ro')
86  grafik.plot(X,T,'b*')
87  grafik.xlabel("X")
88  grafik.ylabel("Y ve T")
89
```