

Assignment-13

18K-U76

step1:  $[x, y], m=1, c=-1, \text{epochs} = 2, G_m = G_c = 0,$

$$\eta = 0.1, \varepsilon = -10^{-8}$$

step2:- iter = 1

step3:- sample = 1

x	y
0.2	3.4
0.4	3.8
0.6	4.2
0.8	4.6

$$\underline{\text{step4:-}} \quad g_m = -(3.4 - (-1)(0.2) + 1) \quad 0.2 = -0.84$$

$$g_c = -(3.4 - (-1)(0.2) + 1) = -4.2$$

$$\underline{\text{step5:}} \quad G_m = 0 + (-0.84)^2 = 0.7056$$

$$G_c = 0 + (-4.2)^2 = 17.64$$

$$\underline{\text{step6:-}} \quad \Delta m = \frac{-\eta}{\sqrt{G_m + \varepsilon}} \quad g_m = \frac{-0.1 \times 0.8}{\sqrt{0.7 + 10^{-8}}} \\ = 0.09$$

$$\Delta c = \frac{-\eta}{\sqrt{G_c + \varepsilon}} \quad g_c = \frac{-0.1 \times 0.09}{\sqrt{17.6 + 10^{-8}}} \\ = 0.09$$

$$\underline{\text{step7:-}} \quad m = m + \Delta m = 1 + 0.09 = 1.09$$

$$c = c + \Delta c = -1 + 0.09 = -0.91$$

$$\underline{\text{step8:-}} \quad \text{sample} = \text{sample} + 1 \\ = 1 + 1 \\ = 2$$

step 9:-  
if (sample > n<sub>s</sub>) if it is true  
go to step 10  
q > 2  
else goto step u.

step u:- g<sub>m</sub> = - (3.8 - (1.09)(0.4) + 0.91) 10<sup>-4</sup>  
g<sub>m</sub> = -1.7  
g<sub>c</sub> = (-3.8 - (1.09)(0.4) + 0.91) = -4.27

step 5:- G<sub>m</sub> = 0.70 + (-1.7)<sup>2</sup> = 3.59  
G<sub>c</sub> = 17.64 + (-4.27)<sup>2</sup> = 35.37

step 6:- Δm =  $\frac{-0.1 \times -1.7}{\sqrt{3.59 + 10^8}} = 0.08$

Δc =  $\frac{-0.1 \times -4.27}{\sqrt{35.8 + 10^8}} = 0.07$

step 7:- m = m + Δm = 1.09 + 0.08 = 1.17  
c = c + Δc = -0.91 + 0.07 = -0.84

step 8:- sample = sample + 1  
= 2 + 1 = 3

step 9:- if (sample > n<sub>s</sub>)  
3 > 2  
goto 10

step 10:- iter + = 1  $\Rightarrow$  1 + 1 = 2

step11 - if (itr > epochs) goto 12  
 else  
 goto step3

step3 sample = 1

$$g_m = (-3 \cdot u - (1.17)(0.2) + 0.8u) \cdot 0.2$$

$$= -0.80$$

$$g_c = -((3 \cdot u - (1.17)(0.2) + 0.8u) \cdot 0.2) = -4.0$$

$$\underline{\text{step5}}: G_m = 3.59 + (-0.80)^2 = u \cdot 23$$

$$G_C = 35.89 + (-u \cdot 0)^2 = 51.89$$

$$\underline{\text{step6}}: \Delta m = \frac{-0.1}{\sqrt{u \cdot 23 + 10^8}} \times -0.80 = 0.038$$

$$\Delta c = \frac{-0.1 \times -u \cdot 0}{\sqrt{51.89 + 10^8}} = 0.05$$

$$\underline{\text{step7}}: m = m + \Delta m = 0.038 + 1.17 = 1.208$$

$$c = c + \Delta c = -0.8u + 0.05 = -0.79$$

step8 - if (sample > n<sub>s</sub>) goto s-10  
 else  
 goto s-4

$$\underline{\text{step9}}: g_m = -(3.8 - (1.20)(0.4) + 0.79) \times 0.4$$

$$= +1.64$$

$$g_C = -(3.8 - (1.20)(0.4) + 0.79) = -4.11$$

step 5:-  $Gm = 4.23 + (-1.64)^2 = 6.9$

$$G_C = 51.89 + (-4.11)^2 = 68.7$$

step 6:-  $\Delta m = \frac{-0.1 \times -7.64}{\sqrt{6.9 + 10^8}} = 0.06$

$$\Delta C = \frac{-0.1 \times -4.11}{\sqrt{68.7 + 10^8}} = 0.04$$

step 7:-  $m = m + \Delta m = 1.208 + 0.06$   
 $= 1.26$

$$C = C + \Delta C = -0.79 + 0.04$$
  
 $= -0.75$

step 8:- sample = sample + 1  
 $= 2 + 1 = 3$

step 9:- if (sample > n<sub>s</sub>) goto step 10  
 $3 > 2$

else goto ④

step 10 :- n<sub>tr</sub> + 1 = 2 + 1 = 3

step 11 :- if (n<sub>tr</sub> > epochs)  
goto S-12

else  
goto S-3

step 12 :-  $m = 1.76$   
 $C = -0.75$