ASSIGNMENT-15

MANUAL CALCULATIONS

Step-1:- $[x, y]$, $\eta = 0.1$, $\delta = 0.9$, epochs = 1, $m = 1$, $c = -1$

$\varepsilon = 10^{-8}$, $\epsilon_m = \epsilon_c = 0$

Step-2:- iter = 1

Step-3:- sample = 1

Step-4:- $g_m = -(3.4(1)(0.2) + 1)(0.2) = -0.84$

$g_c = -4.2$

Step-5:- $\epsilon_m = (0.9)(0) + (0.1)(-0.84)^2 = 0.0705$

$\epsilon_c = (0.9)(0) + (0.1)(-4.2)^2 = 1.764$

Step-6:- $\Delta m = \frac{-0.1}{\sqrt{0.0771 + 10^{-8}}}(-0.841) = 0.327$

$\Delta c = \frac{-0.1}{\sqrt{1.76 + 10^{-8}}}(-4.2) = 0.322$

Step-7:- $m = m + \Delta m = 1 + (-0.314) = 0.686$

$c = c + \Delta c = -1 - 0.322 = -1.322$

Step-8:- sample = sample + 1

$= 1 + 1 = 2$

Step-9:- if (sample > ns) $\Rightarrow$ (2 > 2) goto Step4

Step-10:- $g_m = -(3.5 - (0.686) \times (0.4) + 1.322)(0.4)$

$= -1.93904$ $\quad g_c = -4.8476$

step-11:- $\epsilon_m = (0.9) \times (0.0705) + (0.1) \times (-1.93904)$

$= 0.4394$

$\epsilon_c = (0.9) \times (1.764) + (0.1) \times (-4.8476)$

$= 3.9875$

step-12:- $\Delta m = \frac{-0.1}{\sqrt{0.4394 + 10^{-9}}} \times (-.93904) = 0.2925$

$\Delta c = \frac{-0.1}{\sqrt{3.9875 + 10^{-8}}} \times (-4.8476) = 0.2442$

step-13:- $m = m + \Delta m = 0.9785$

$c = c + \Delta c = -1.0778$

step-14:- sample = sample + 1 = 201 = 3 >no of samples

step-15:- epoch = 1 + 1 = 2 < epoch

step-16:- sample = 1

step-17:- $g_m = -(3.4 - (0.9785 \times 0.2) + 1.0778) \times 0.2$

$= -0.85642$

$g_c = -4.2821$

step-18:- $\epsilon_m = 0.46957$

$\epsilon_c = 5.3773$

step-19:- $\Delta m = \frac{-0.1}{\sqrt{0.46957 + 10^{-8}}} \times (-0.85642) = 0.0588$

$\Delta c = \frac{-0.1}{\sqrt{5.3773 + 10^{-8}}} \times (-4.2821) = 0.1846$

Step-20:- $m = m + \Delta m = 0.9785 + 0.0586 = 1.0371$

$c = c + \Delta c = -1.0778 + 0.18466 = -0.89314$

step 21:- sample = sample+1

step-22:- $gm = -(3.8 - (1.0371 \times 0.4) + 0.89314) \times 0.4$

$= -1.07113^2$

$gc = -4.2783$

Step-23:- $\epsilon m = (0.9) \times (5.3773) + (0.1) \times (-4.2783)$

$= 6.6699$

step-24:- $\Delta m = \frac{-0.1}{\sqrt{0.71547 + 10^8}} \times (-1.0713^2) = 0.20231$

$\Delta c = \frac{-0.1}{\sqrt{6.6699 + 10^8}} \times (-4.2783) = 0.16565$

Step-25:- $m = m + \Delta m = 1.0371 + 0.20231 = 1.23941$

$c = c + \Delta c = -0.89314 + 0.16565 = -0.72749$

Step-26:- sample = 2+1 = 3 > no of samples

Step-27:- iter = iter+1 = 3 > no of epochs

step-28:- print (m, c) = (1.23941, -0.72749)

step-29:- calculating mean square error

$mse = \frac{1}{2 \times 2} \left[(3.4 - (1.23941 \times 0.2 + 0.72749))^2 + (3.8 - (1.23941 \times 0.4 + 0.72749))^2 \right]$

$= 7.82654$