Manual Calculations :

step 1: $[x, y]$, $\eta = 0.1$, $\gamma = 0.9$, epochs $= 1$, $m = 1$, $c = -1$, $\varepsilon = 10^{-8}$,

$E_m = E_c = 0$

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: $E_m = (0.9)(0) + (0.1)(-0.84)^2 = 0.0705$

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

step-6: $\Delta m = \frac{-0.1}{\sqrt{0.07 + 10^{-8}}} (-0.84) = 0.317$

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

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 > n_s) ⇒ (2 > 2) goto step 4

step-10: $g_m = -(3.8-(0.686)\times(0.4)+1.322)\times(0.4)$
$= -1.93904$

$g_c = -4.8476$

step-11: $E_m = (0.9)\times(0.0705)+(0.1)\times(-1.93904)^2$
$= 0.4394$

$E_c = (0.9)^4\times(1.764)+(0.1)\times(-4.8476)^2$
$= 3.9375$

step-12: $\Delta m = \dfrac{-0.1}{\sqrt{0.4394+10^{-8}}}\times(-1.93904) = 0.2925$

$\Delta c = \dfrac{-0.1}{\sqrt{3.9375+10^{-8}}}\times(-4.8476) = 0.2442$

step-13: $m = m+\Delta m = 0.9785$
$c = c+\Delta c = -1.0778$

step-14: sample = sample + 1 = 2+1 = 3 > no-of-samples

step-15: iter = 1+1 = 2 < epochs

step-16: sample = 1

step-17: $g_m = -(3.4-(0.9785\times0.2)+1.0778)\times0.2$
$= -0.85642$

$g_c = -4.2821$

step-18: $E_m = (0.9)\times(0.4394)+(0.1)\times(-0.85642)^2$

$= 0.46957$

$$E_c = (0.9 \times 3.9375) + (0.1) \times (\overset{-4.2821}{\cancel{-0.85642}})^2$$
$$= 5.3773$$

step-19: $$\Delta m = \frac{-0.1}{\sqrt{0.46957 + 10^{-8}}} \times (-0.85842) = 0.05868$$

$$\Delta c = \frac{-0.1}{\sqrt{5.3773 + 10^{-8}}} \times (-4.2821) = 0.18466$$

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: $$g_m = -(3.8 - (1.0371 \times 0.4) + 0.89314) \times 0.4$$
$$= -1.71132$$

$$g_c = -4.2783$$

step-23: $$E_m = (0.9) \times (0.46957) + (0.1) \times (-1.71132)^2$$
$$= 0.71547$$

$$E_c = (0.9) \times (5.3773) + (0.1) \times (-4.2783)^2$$
$$= 6.6699$$

step-24: $\Delta m = \frac{-0.1}{\sqrt{0.71547+10^{-8}}} \times (-1.71132) = 0.20231$

$\Delta c = \frac{-0.1}{\sqrt{6.6699+10^{-8}}} \times (-4.27883) = 0.16565$

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 squared error

$$mse = \frac{1}{2\times2}\left[(3.4-(1.23941\times0.2+0.72749))^2 + (3.8-(1.23941\times0.4+0.72749))^2\right]$$

$$= \frac{1}{4}\left[15.05135 + 16.25481\right]$$

$$mse = 7.82654$$