RMS prop optimzers

Sample (i)	$X_i^\wedge$	$Y_i^\wedge$
1	0.2	3.4
2	0.4	3.8
3	0.6	4.2
4	0.8	4.6

step 1: (x, y), $n = 0.1$, epochs $= 2$, $m = 1, c = -1$, $\beta = 0.1$

$Em = Ec = 0$ $\varepsilon = 10^?$

Step 2: itr = 1

step 3: sample = 1

step 4: $gm = -[3.4 - (1)(0.2) + 1](0.2) = -0.84$

$gc = -[3.4 - (1)(0.2) + 1] = 4.2$

Step 5: $Em = (0.9)(0) + (1 - 0.9)(-0.84)^2 = 0.07$

$Ec = (0.9)(0) + (1 - 0.9)(-4.2)^2 = 1.764$

step 6: $Dm = \dfrac{-0.1}{\sqrt{0.07 + 10^8}} * (-0.84) = 0.31$

$Dc = \dfrac{-0.1}{\sqrt{1.764 + 10^8}} * (-4.2) = 0.31$

step 7: $m = m + Dm = 1 + 0.31 = 1.31$

$c = c + Dm = -1 + 0.31 = -0.69$

Step-8: sample = 1 + 1 = 2

step-9: If (sample > ns)

2 > 2

false   goto step 4

$$g_m = -\left[3.8 - (1.31)(0.4) + 0.69\right](0.4)$$

$$g_m = -1.5$$

$$g_c = -\left[3.8 - (1.31)(0.4) + 0.69\right]$$

$$g_c = -3.9$$

Step 5: $\quad E_m = (0.9)(0.07) + (0.1)(-1.5)^2 = 0.28$

$$E_c = (0.9)(1.76) + (0.1)(-3.9)^2 = 3.1$$

Step 6: $\quad \delta_m = \dfrac{-0.1}{\sqrt{0.28 + 10^7}} \times -1.5 = 0.28$

$$\Delta c = \dfrac{-0.1}{\sqrt{3.1 + 10^7}} \times -3.9 = 0.22$$

Step 7: $\quad m = m + \delta m = 1.31 + 0.28 = 1.59$

$$c = c + \Delta c = -0.69 + 0.22 = -0.47$$

Step 8: $\quad$ sample = 2 + 1 = 3

Step 9: $\quad$ if (sample > n s)

$$3 > 2$$

$$\text{True goto step } \textcircled{10}$$

Step ⑩ : $\quad$ itr = itr + 1 = 1 + 1 = 2

Step ⑪ : $\quad$ if (itr > epochs)

$$2 > 2$$

Step 3 : $\quad$ sample = 1

Step 4 : $\quad g_m = -\left[3.4 - (1.59)(0.2) + 0.47\right](0.2)$

$$g_m = -0.7$$

$$g_c = -\left[3.4 - (1.59)(0.2) + 0.47\right]$$

$$g_m = -3.5$$

step 5 : $E_m = (0.1)(0.28) + (0.1)(-0.3)^2 = 0.3$

$E_c = (0.9)(3.1) + (0.1)(-2.5)^2 = 4.0$

step 6: $Dm = \dfrac{-0.1}{10.3 \times 10^8} \times -0.7 = 0.12$

$\Delta c = \dfrac{-0.1}{\sqrt{4.0 + 10^8}} \times -3.5 = 0.17$

step 7: $m = m + \Delta m = 1.59 + 0.12 = 1.71$

$c = c + \Delta c = 0.47 + 0.17 = 0.2$

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

step 9: if (sample > ns)

$2 > 2$

step 4: $g_m = -[3.8 + (1.71)(0.4) + 0.3](0.4)$

$g_m = -1.4$

$g_c = -[3.8 - (1.71)(0.4) + 0.3]$

$g_c = -3.6$

step 5: $E_m = (0.9)(0.2) + (0.1)(-1.4)^2 = 0.46$

$E_c = (0.9)(4.0) + (0.1)(-3.6)^2 = 4.89$

step 6: $Dm = \dfrac{-0.1}{\sqrt{0.46 + 10^2}} \times -1.4 = 0.2$

$D_c = \dfrac{-0.1}{\sqrt{4.89 + 10^8}} \times -3.6 = 0.16$

step 7: $m = m + Dm = 1.74 + 0.2 = 1.91$

$c = c + Dm = -0.3 + 0.16 = -0.14$

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

step 9: if (sample > ns)

$3 > 2$

step 10: $itr = itr + 1 = 2 + 1 = 3$

step 11: $if (itr > epochs)$
$$3 > 2$$

step 12: $m = 1.91$
$$c = -0.14$$