Assignment-15

18K41A0528

Manual Calculations for two iterations of RMS optimizer

Sample	x	y
1	0.2	3.4
2	0.4	3.8
3	0.6	4.2
4	0.8	4.6

Step-1: $\eta = 0.1$, epochs = 2, $m = 1$, $c = -1$, $\beta = 0.9$, $Em = Ec = 0$, $\varepsilon = 10^{-8}$

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: $\Delta m = \frac{-0.1}{\sqrt{0.07 + 10^{-8}}} \times -0.84 = 0.31$

$\Delta c = \frac{-0.1}{\sqrt{1.764 + 10^{-8}}} \times -4.2 = 0.31$

Step-7: $m = m + \Delta m = 1 + 0.31 = 1.31$

$c = c + \Delta c = -1 + 0.31 = -0.69$

Step-8: Sample = Sample + 1 = 1 + 1 = 2

Step-3: if (sample > ns)
go to next step
else
go to step-4

Step-4: $g_m = -(3.8 - (1.31)(0.4) + 0.64)0.4 = -1.3$

$g_c = -(3.8 - (1.31)(0.4) + 0.64) = -3.9$

Step-5: $E_m = (0.4)(0.07) + (0.1)(-1.3)^2 = 0.28$

$E_c = (0.4)(1.74) + (0.1)(-3.4)^2 = 3.1$

Step-6: $\Delta m = \frac{-0.1}{\sqrt{0.28 + 10^{-8}}} \times -1.3 = 0.28$

$\Delta c = \frac{-0.1}{\sqrt{0.28 + 10^{-8}}} \times -3.4 = 0.22$

Step-7: $m = m + \Delta m = 1.31 + 0.28 = 1.34$

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

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

$3 > 2$

Step-9: if (sample > ns)
step10

Step-10: itr = itr + 1 = 1 + 1 = 2

Step-11: if (itr > epochs)
go to step-12
else
go to step-3

Step-3: Sample = 1

Step-4: $g_m = -(3.4-(1.50)(0.2)+0.47)(0.2) = -0.7$

$g_c = -(34-(1.50)(0.1)+0.47) = -7.8$

Step-5: $E_m = (0.9)(0.28)+(0.1)(-0.7)^2 = 0.3$

$E_c = (0.9)(3.1)+(0.1)(-3.5)^2 = 4.0$

Step-6: $\Delta m = \frac{-0.1}{\sqrt{0.3+10^8}} \times 0.7 = 0.12$

$\Delta c = \frac{-0.1}{\sqrt{4.0+10^8}} \times -33 = 0.1$

Step-7: $m = m+\Delta m = 1.50+0.12 = 1.71$

$c = c+\Delta m = -0.47+0.17 = -0.3$

Step8: sample = Sample+1 = 1+1 = 2

Step9: if(sample > ns)

go to step10

else

go to step 4

Step-4: $g_m = -(3.8-(1.71)(0.4)+0.3)\times 0.4 = -1.4$

$g_c = -(3.8-(1.71)(0.4)+0.3) = -3.6$

Step-5: $E_m = (0.9)(0.3)+(0.1)(1.4)^2 = 0.46$

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

Step-6: $\Delta m = \frac{-0.1}{\sqrt{0.46+10^8}} \times -1.4 = 0.2$

$\Delta c = \frac{-0.1}{\sqrt{4.89+10^8}} \times -3.6 = 0.16$

Step-7: $m = m + \Delta m = 1.71 + 0.2 = 1.91$

$c = c + \Delta m = -0.3 + 0.16 = -0.14$

Step-8: sample = sample + 1 = 2 + 1 = 3
(3) (2)

Step-9: if (sample > ns)

go to next step

else

go to step-4

Step-10: itr = itr + 1 = 2 + 1 = 3
(3) (2)

Step-11: if (itr > epochs)

go to next step

Step-12: $m = 1.91$, $c = -0.14$