

## Assignment-7

1)  $[x, y]$ ,  $m=1$ ,  $c=-1$ ,  $\eta=0.1$ ,  $epochs=2$ ,  $ns=2$

2)  $it=1$

3)  $\frac{\partial E}{\partial m} = -\frac{1}{ns} \sum_{i=1}^{ns} (y_i - mx_i - c)x_i$

x	y
0.2	3.4
0.4	3.8
0.6	4.2
0.8	4.6

$$= -\frac{1}{2} [(3.4 - 1(0.2) + 1)(0.2) + (3.8 - 1(0.4) + 1)(0.4)]$$

$$= -\frac{1}{2} [0.64 + 1.76] = -1.3$$

$$\frac{\partial E}{\partial c} = -\frac{1}{2} [(3.4 - 1(0.2) + 1) + (3.8 - 1(0.4) + 1)]$$
$$= -\frac{1}{2} [4.2 + 4.4] = -4.3$$

4)  $\Delta m = -\frac{\eta}{ns} (-1.3) = \frac{0.1}{2} (1.3) = 0.065$

$$\Delta c = -\frac{\eta}{ns} (-4.3) = -\frac{0.1}{2} (-4.3) = 0.215$$

5)  $m = m + \Delta m = 1 + 0.065 = 1.065$

$$c = c + \Delta c = -1 + 0.215 = -0.785$$

6)  $it = it + 1 = 1 + 1 = 2$

7)  $if(2 > 2)$

$\hookrightarrow$  3)  $\frac{\partial E}{\partial m} = -\frac{1}{2} [(3.4 - 1.065(0.2) + 0.785)(0.2) + (3.8 - 1.065(0.4) + 0.785)(0.4)]$

$$= -\frac{1}{2} [\cancel{0.79}(3.975)0.2 + 4.165 \times 0.4]$$

$$= -\frac{1}{2} [0.79 + 1.66] = -1.07$$

$$\frac{\partial E}{\partial c} = -\frac{1}{2} [(3.4 - 1.065(0.2) + 0.785) + (3.8 - 1.065(0.4) + 0.785)]$$

$$= -\frac{1}{2} [3.975 + 4.165]$$

$$= -\frac{1}{2} (8.14) = -4.07$$

$$4) \Delta m = -\frac{0.1}{2} (-1.07) = 0.05$$

$$\Delta c = -\frac{0.1}{2} (-4.07) = 0.2$$

$$5) m = 1.065 + 0.05 = 1.11$$

$$c = -0.785 + 0.2 = -0.585$$

$$6) it = 2 + 1 = 3$$

$$7) \text{if } (3 > 2) \checkmark$$

$$8) m = 1.11, c = -0.585$$