

## Assignment-(4A)

Case-I

$\Rightarrow$  Iteration = 1,  $\eta = 0.1$ ,  $m = 1$ ,  $c = -1$

$$y_p = mx + c = 6.6$$

$$E = \frac{1}{2} (y_a - mx - c)^2 \Rightarrow \frac{1}{2} (157 - (1)(7.6) - (-1))^2$$

$$E = 11310.08$$

$$\frac{\partial E}{\partial m} = -(y_a - mx - c)x = -(157 - 6.6) \times 7.6 = -1143.04$$

$$\frac{\partial E}{\partial c} = -(y_a - mx - c) = -150.4$$

$$\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.1)(-1143.04) = 114.304$$

$$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.1)(-150.4) = 15.04$$

$$m = 1 + 114.304 = 115.304$$

$$c = -1 + 15.04 = 14.04$$

Case-II

$\Rightarrow$  Iteration = 2,  $\eta = 0.1$ ,  $m = 115.304$ ,  $c = 14.04$

$$y_p = mx + c = (115.304)(7.6) + 14.04$$

$$y_p \Rightarrow 832.6984$$

$$E = \frac{1}{2} (y_a - mx - c)^2 = \frac{1}{2} (157 - 832.6984)^2$$

$$E = 216941.791$$

$$\frac{\partial E}{\partial m} = -(174 - 832.6984)(2.1) = 4676.759$$

$$\frac{\partial E}{\partial m} = -(174 - 832.6984) = 658.698$$

$$\Delta m = -(0.1)(4676.759) = -467.6759$$

$$\Delta c = -(0.1)(658.698) = -65.8698$$

$$m = 115.304 - 467.676 = -352.372$$

$$c = 14.04 - 65.8698 = -51.8298$$

Case-II-

$$\text{Iteration } n=2, \eta=0.1, m=-352.372, c=-51.8298$$

$$y_p = (-352.372)(1.6) + (-51.8298) \\ = -2729.857$$

$$E = \frac{1}{2} (157 + 2729.857)^2 = 8733943.338$$

$$\frac{\partial E}{\partial m} = -(3479.685)(1.6) = -26445.606$$

$$\frac{\partial E}{\partial c} = -3479.685$$

$$\Delta m = -(0.1)(-26445.606) = 2644.566$$

$$\Delta c = -(0.1)(-3479.685) = 347.969$$

$$m = -352.372 + 2644.566 = 2292.188$$

$$c = -64.658 + 347.969 = 283.311$$

Iteration 2,  $\eta = 0.1$ ,  $m = 2292.188$ ,  $c = -296.689$

$$y_p = (2292.188)(2.1) - 296.689 = 15977.846$$

$$E = \frac{1}{2} (174 - 15977.846)^2 = 124180771.035$$

$$\frac{\partial E}{\partial m} = (174 - 15977.846)(2.1) = 112207.305$$

$$\frac{\partial E}{\partial c} = -(174 - 15977.846) = 15803.846$$

$$\Delta m = -(0.1)(112207.305) = -11220.731$$

$$\Delta c = -(0.1)(15803.846) = -1580.385$$

$$m = 2292.188 - 11220.731 = -8928.543$$

$$c = -296.689 - 1580.385 = -1877.074$$