LINEAR REGRESSION ASSIGNMENT – PART II QUESTION 2.1

GRADIENT DESCENT ALGORITHM – UNIVARIATE FUNCTION

$J(x) = x^2 + x + 1$, $\eta = 0.1$, $x_0 = 1$

SOLUTION:

$$J(x) = x^2 + x + 1$$

$$= 1x^2 + 1x + 1$$

$a \quad b \quad c$

So $x = \frac{-b}{2a}$

$$x = \frac{-1}{2 \times 1}$$

$x = -\frac{1}{2} \Longrightarrow$ MINIMA $= -0.5$

$$\theta_{new} = \theta_{old} - \eta \left. \frac{\partial J}{\partial \theta} \right|_{\theta = \theta_{old}}$$

$J'(x) = 2x + 1 = 0$

1ST ITERATION

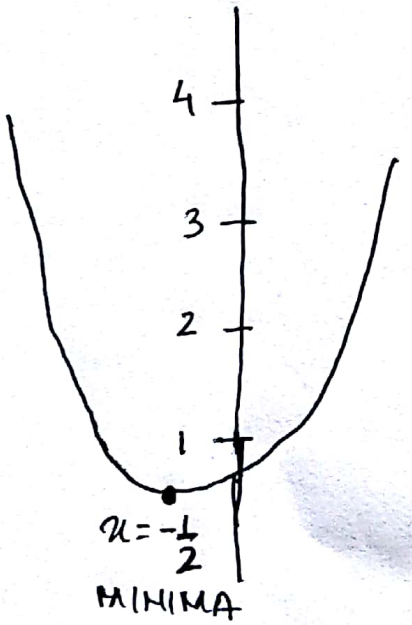
$$\theta_{new} = \theta_{old} - \eta(2x + 1)$$

$$\theta_{new} = 1 - 0.1(2 \times 1 + 1)$$

$$= 1 - 0.1(3)$$

$$= 1 - 0.3$$

$$= 0.7$$



2nd ITERATION

$$\theta_{new} = 0.7 - \eta(2 \times 0.7 + 1)$$

$$= 0.7 - 0.1(2.4)$$

$$= 0.7 - 0.24$$

$$= 0.46$$