Assignment – 3(A)

$f(x,y) = 3x^2 + 5e^{-y} + 10$

$\eta = 0.01, \; x = 2, \; y = 3, \; \text{epochs} = 100, \; \text{iter} = 1$

Iteration - 1

$$\left.\frac{\partial f}{\partial x}\right|_{x=2} = 6x = 6 \times 2 = 12$$

$$\left.\frac{\partial f}{\partial y}\right|_{y=3} = -5xe^{-3} = -0.24$$

$$\Delta x = -\eta \left.\frac{\partial f}{\partial x}\right|_{x=2} = -(0.01)(12) = -0.12$$

$$\Delta y = -\eta \left.\frac{\partial f}{\partial x}\right|_{y=2} = -(0.01)(-0.24) = 0.0024$$

$$x = x + \Delta x = 2 - 0.12 = 1.88$$

$$y = y + \Delta y = 3 + 0.0024 = 3.0024$$

Iteration - 2

$$\left.\frac{\partial f}{\partial x}\right|_{x=1.88} = 6)(1.88) = 11.28$$

$$\left.\frac{\partial f}{\partial y}\right|_{y=3.002} = -5xe^{-3.002} = 0.24$$

$$\Delta x = -\eta \left.\frac{\partial f}{\partial x}\right|_{x=2} = -(0.01)(11.28) = -0.1128$$

$$x = x + \Delta x = 1.88 - 0.1128 = 1.76$$

$$y = y + \Delta y = 3.002 + 0.0024 = 3.004$$

$$\Delta y = -\eta \left.\frac{\partial f}{\partial y}\right|_{y=3.002} = -(0.01)(-0.24) = 0.0024$$