18K41A05F9

Assignment-02

Step-1 : $f(x,y) = x^2 + y^2 + 10$

$$\frac{\partial f}{\partial y} = 2x \quad , \quad \frac{\partial f}{\partial y} = 2y$$

Step-2:

$x = -1$

$y = 2$

$\eta = 0.01$

iter = 1

epochs = 2

Step-3:

$$\frac{\partial f}{\partial x} = 2x = 2(-1) = -2$$

$$\frac{\partial f}{\partial y} = 2y = 2(2) = 4$$

Step-4:

$$\Delta x = -\eta \frac{\partial f}{\partial x} = -(0.01)(-2)$$

$$= 0.02$$

$$\Delta y = -\eta \frac{\partial f}{\partial y} = -(0.01)(4)$$

$$= -0.04$$

Step-5: $x = x + \Delta x$

$x = -1 + 0.02$

$x = -0.98$

$y = y + \Delta y$

$y = 2 + (-0.04)$

$y = 1.96$

Step-6: iter = iter + 1

$= 1 + 1 = 2$

iter = 2 $\leq$ epochs

next step-3

Step-7:

$$\frac{\partial f}{\partial x} = 2(-0.98) = -1.96$$

$$\frac{\partial f}{\partial y} = 2(1.96) = 3.92$$

Step-8: $\Delta x = -\eta \frac{\partial f}{\partial x} = -(0.01)(-1.96)$

$= 0.0196$

$\Delta y = -\eta \frac{\partial f}{\partial y} = -(0.01)(3.92)$

$= -0.0392$

Step-9: $x = x + \Delta x = -0.98 + (0.0196)$

$= -0.9604$

$y = y + \Delta y = 1.96 + (-0.0392)$

$= 1.9208$

step-10 : iter = iter + 1

= 2 + 1 = 3 > epochs

hence stop and goto next step.

step-11 :

$$f(x,y) = (0.0196)^2 + (0.0392)^2 + 10$$

$f(x,y) = 10.0019208$ for 2 iterations