Assignment -2

Find global minimum point and value for function

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

→ Manual calculation for 2 iterations

step 1 :- $x = -1$ $y = +1$ $\eta = 0.1$ epoches = 2

step 2 :- iter = 1

step 3 :- $\frac{\partial f}{\partial x} = 2x = -2$

$$\frac{\partial f}{\partial y} = 2y = 2$$

step 4 : $\Delta x = -\eta \frac{\partial f}{\partial x} = -0.1(-2)$

$= 0.2$

$$\Delta y = -\eta \frac{\partial f}{\partial x} = -(0.1)(2)$$

$= -0.2$

step 5 :- $x = x + \Delta x = -1 + 0.2$

$= -0.8$

$y = y + \Delta y = 1 - 0.2$

$= 0.8$

step 6 :- iter = iter + 1

$= 1 + 1$

$= 2$

step 7 :- if (iter > epochs)

True → goto step 8

else

goto step 3.

if (2 > 2)

goto step 3

step 3 :-

$$\frac{\partial f}{\partial x} = 2x = 2(-0.8)$$

$$= -1.6$$

$$\frac{\partial f}{\partial y} = 2y = 2(0.8) = 1.6$$

step 4 :- $\Delta x = -\eta \frac{\partial f}{\partial x}$

$$= -(0.1)(-1.6) = 0.16$$

$$\Delta y = -\eta \frac{\partial f}{\partial y}$$

$$= -(0.1)(1.6) = -0.16$$

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

$$= -0.8 + 0.16$$

$$= -0.64$$

$y = y + \Delta y$

$= 0.8 - 0.16$

$= 0.64$

step 6 :- itr = itr + 1

$= 2 + 1$

$= 3$

step 7 :- if (itr(3) > epochs(3))

goto to step 2

else goto step 3.

step 8 :- $x = -0.64$

$y = 0.64$

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

$= (-0.64)^2 + (0.64)^2 + 10$

$= 0.4 + 0.4 + 10$

$= 10.8$