ASSIGNMENT-2

find global minimum point and value for function $f(x,y) = x^2 + y^2 + 10$

→ do manual calculations for 2 iterations

steps

step 1: Initializing variables

$x = -1, \quad y = +1, \quad \eta = 0.1, \quad \text{epoches} = 2$

step 2: set itr = 1

step 3: $\frac{\partial f}{\partial x}\Big|_{x=-1} = 2x = -2$

$\frac{\partial f}{\partial y}\Big|_{y=+1} = 2y = 2$

step 4: $\Delta x = -\eta \frac{\partial f}{\partial x} = -(0.1)(-2) = 0.2$

$\Delta y = -\eta \frac{\partial f}{\partial y} = -(0.1)(2) = -0.2$

step 5: $x = x + \Delta x = -1 + 0.2 = -0.8$

$y = y + \Delta y = 1 - 0.2 = 0.8$

Step 6 : its = its + 1 = 1 + 1 = 2

Step 7 : if (its > epochs)

go to step 5

else

goto step 3

Step 3 : $\frac{\partial f}{\partial x} = 2x = 2(-0.8) = -1.6$

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

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 : $x = x + \Delta x$

$= -0.8 + 0.16 \Rightarrow -0.64$

$y = y + \Delta y$

$= 0.8 - 0.16 = 0.64$

Step 6: $itr = itr + 1 = 2 + 1 = 3$

Step 7: if ($itr > epochs$)

$3 > 2$

goto step 8

else: goto step 3

Step 8: $x = -0.64$

$y = 0.64$

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

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

$= 0.4 + 0.4 + 10$

$= 10.8$