Assignment-2

MBK4100SEC

Steps

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

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

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

2) $x = 1$
$y = -1$
$\eta = 0.1$
$steps = 1$
epochs = 2

3) $\frac{\partial f}{\partial x}\Big|_{x=1} = f(1) = 2$

$\frac{\partial f}{\partial y}\Big|_{y=1} = f(-1) = -2$

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

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

5) $x = x + \Delta x = -1 + (-0.2) = 0.8$

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

6) steps = steps + 1 = 1 + 1 = 2 ≤ epochs
goto step 7

7) $\frac{\partial f}{\partial x}\Big|_{x=0.8} = 2(0.8) = 1.6$

$\frac{\partial f}{\partial y}\Big|_{y=-0.8} = 2(-0.8) = -1.6$

8) $\Delta x = -\eta \frac{\partial f}{\partial x} = -(0.1)(1.6) = -0.16$

$\Delta y = -\eta \frac{\partial f}{\partial y} = -(0.1) \times (-1.6) = 0.16$

9) $x = x + \Delta x = 0.8 - 0.16 = 0.64$

$y = y + \Delta y = -0.8 + 0.16 = -0.64$

10) ~~iter~~ $= iter + 1 = 2 + 1 = 3 >$ epochs

goto next step

11) $f(x, y) = (0.16)^2 + (-0.16)^2 + 10$

$= 10.0512$

Global point = $(0.16, -0.16)$

Global value = 10.0512