18K41A04C8

Assignment-2 :

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

Do manual calculation for 2 itesations.

Step 1 : $x = -1$, $y = 1$, $\eta = 0.1$, epochs $= 2$

Step 2 : iter $= 1$

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

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

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

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

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

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

Step 6 : iter = iter + 1 = 1 + 1 = 2

Step 7 : if (iter > epochs)

2 > 2

false

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

$\Delta x = 0.16$

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

Step 5: $x = x + \Delta x = -0.8 + 0.16 = -0.64.$

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

Step 6: iter = iter + 1 = 2 + 1 = 3

Step 7: if (iter > epochs)

3 > 2

True

goto next step.

Step 8: print x, y values, f(x,y)

$x = -0.64$

$y = 0.64$

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

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

$f(x,y) = 10.81$