

## Assignment 2/

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

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

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

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  $\neq$  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:  $iter = iter + 1 = 2 + 1 = 3$

step 7:  $if (iter > epochs)$

$$3 > 2$$

go to next step

step 8:  $x, y = -0.64, 0.64$

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

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

$$f(x, y) = 10.81$$