

Assignment 2

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

→ Do manual calculations for 2 iterations.

step 1: $x = -1, y = 1, \eta = 0.1, \text{epochs} = 2$

step 2: iter = 1

step 3: $\frac{\partial F}{\partial x} = 2x = 2(-1) = -2$

$$\frac{\partial F}{\partial y} = 2y = 2(1) = 2$$

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)

$$2 > 2$$

True go to next step

False go to step 2

$$\text{iter} = 2$$

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

$$\frac{\partial f}{\partial y} = 2y = 2(0.6) = 1.2$$

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

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

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

$$= -(0.1)(1.2) = -0.12$$

$$\text{step 5: } x = x + \Delta x$$

$$= -0.8 + 0.16 = -0.64$$

$$\text{step 6: } \text{iter} = \text{iter} + 1$$

$$2 + 1 = 3$$

$$\text{step 7: } \text{if}(\text{iter} > \text{epochs})$$

$$3 > 2$$

True go to next step

False go to step 3

$$\text{step 8: } x = -0.64, y = 0.64$$

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

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

$$= 0.41 + 0.41 + 10$$

$$= 10.8$$