Assignment - 2

18K41A0508

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

- Do manual calculations for two iterations

step 1 : $x = -1$ $y = +1$ $\eta = 0.1$ epoches = 2

step 2: itr = 1

step 3: $\frac{\partial f}{\partial x} = 2x = -2$, $\frac{\partial f}{\partial y} = 2y = 2$

step 4: $dx = -\eta \frac{df}{dx} = -2(-0.1) = 0.2$

$\Delta y = -\eta \frac{df}{dy} = -(0.1)(2) = -0.2$

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

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

step 6 : itr = itr + 1

$= 1 + 1 = 2$

step 7 : if (itr > epoches)

goto step 5

else

goto step 3

step 3: $\frac{df}{dx} = 2x = 2(-0.8) = -1.6$

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

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: $itr = itr + 1$

$$= 2 + 1 = 3$$

step 7: if ($itr > epoches$)

$3 > 2$

goto step 8

else

goto step 3

step 8: $x = -0.64$

$y = 0.64$

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

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

$$= 0.4 + 0.4 + 10$$

$$= 10.8$$