Assignment-2

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→ find the global minimum point & value for function

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

→ Do manual calculations for 2 iterations

→ find the optimal solution using python programming

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

$= 0.2$

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

$= -0.2$

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

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

step-6: itr = itr+1

step-7: if (itr > epochs)

goto step 5

else

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 $x = x + \Delta x$ $\quad y = \Delta y + y$

$= -0.8 + 0.16$ $\quad = 0.8 - 0.16$

$= -0.64$ $\quad = 0.64$

step 6 $itr = itr + 1$

$2 + 1 = 3$

step 7 if (itr > epochs)

$3 > 2$

goto step -8

else

step 3

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

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

$0.4 + 0.4 + 10$

$= 10.84$