ASSIGNMENT-I 18K-565

Find global minimum point and value for function. $f(x) = x^4 + 3x^2 + 10$.

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step 1: Initialize variables

$x = 1$, $\eta = 0.1$, epochs $= 2$

step 2: $\left(\frac{\partial f}{\partial x}\right)_{x=1} = (4x^3 + 6x)_1 = 4(1) + 6(1) = 10$.

step 3: calculate change in x

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

$$= -(0.1)(10)$$

$$\Delta x = -1$$

step 4: $x = x + \Delta x$

$= 1 + (-1)$

$x = 0$

step 5: itr = itr + 1

step 6: if (itr > epochs) then

go to step 7

else, go to step 2

itr = 2, epochs = 2

2 > 2 → false

hence, go to step 2

step 2 : calculate first order derivative of f(x) at x = 0.

$$\left(\frac{\partial f}{\partial x}\right)_{x=0} = (4x^3 + 6x)_0 = 0$$

step 3: calculate change in x

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

$$= -(0.1)0$$

$$= 0$$

step 4: $x = x + \Delta x$

$= 0 + 0 = 0$

step 5: itr = itr + 1

step 6: if (itr > epochs) go to step 7

else go to step 2

here, itr = 3, epochs = 2

3 > 2, True

go to step 7

Step 7: print variable $x \Rightarrow x=0$.

at $x=0$ we find minimum value of function $f(x)$ that minimum value = $f(0)=10$.