Assignment-1 18KH1A0515

Q) Find global minimum point and value for function

$f(x) = x^4 + 3x^2 + 10$

given $f(x) = x^4 + 3x^2 + 10$

step 1: Initialize other variables

$x = 1$

$\eta = 0.1$

epoches = 2

step 2: First order derivative of $f(x)$ at $x = 1$

$\left(\frac{df}{dx}\right)_{x=1} = (4x^3 + 6x)_{,} = 4(1) + 6(1) = 10$

step 3:- calculating the change in x

$\Delta x = -\eta \frac{df}{dx}$

$= -(0.1)(10)$

$\Delta x = -1$

step 4: updation of variable x

$x = x + \Delta x$

$= 1 + (-1)$

$x = 0$

step 5:- Increment Iterations

$itr = itr + 1$

Step 6:- if (itr > epoches) then next step

else, go to step 2

here, itr = 2, epoches = 2

2 > 2 — ✗

go to step 2

Step 2:- calculate first order derivative of $f(x)$

at $x = 0$

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

Step 3: calculate change in x

$$\Delta x = -\frac{\eta df}{dx}$$

$$= -(0.1)\,0$$

$$= 0$$

Step 4: updation of variable x

$$x = x + \Delta x$$

$$= 0 + 0$$

$$= 0$$

Step 5: Increment iterations

itr = itr + 1

Step 6:- if (itr > epoches) next step 7

else go to Step 2

itr = 3, epoches = 2

3 > 2 ✓

Step 7:- Print variable $x \Rightarrow x = 0$

at $x = 0$ we found min value of function $f(x)$,

$\therefore f(0) = 10.$