Assignment - 1 18KUDA05F3

1) Find the global minimum point for 2 iterations

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

Step 0: Initialization

$x = 1.2$, $\eta = 0.01$, epochs = 2, Iteration = 1

Step 1: derivation at $x = 1.2$

$$\left(\frac{df}{dx}\right)_{x=1.2} = (4x^3 + 6x) = 4(1.2)^3 + 6(1.2)$$

$$= 6.912 + 7.2$$

$$= 14.112$$

Step 2:

$$\Delta x = -\eta \frac{df}{dx} = (-0.01)(14.112)$$

$$= -0.14112$$

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

$x = 1.2 - 0.14112$

$= 1.05888$

Step 5: Iteration = Iteration + 1

$= 1 + 1$

$= 2$

Step 6: if (iter > epochs)

2 > 2 go to step 7

else
go to step 2

→

here 2 > 2
then go to step 2

step 2: $\left(\frac{df}{dx}\right)_{at}$ $x = 1.05$

$4x^3 + 6x = 4(1.05)^3 + 6(1.05)$

$= 10.9305$

Step 3: $\Delta x = -\eta \frac{df}{dx}$

$-(0.01)(10.9305)$

$= 0.109305$

Step 4 = $x = x + \Delta x$

$1.05 + 0.109305$

$= 1.159305$

step 5: iteration = iteration + 1

= 2 + 1

= 3

step 6: if (iteration < epochs)

go to step 3

else

go to step 2

3 < 2

~~true~~ False

step 7: $x = 1.15$

$x^4 + 3x^2 + 10$

$(1.15)^4 + 3(1.15)^2 + 10$

$\Rightarrow 15.7165$