

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

Do manual calculations for two iterations.

$$\frac{df}{dx} = 4x^3 + 6x$$

$$f'(x) = 4x^3 + 6x$$

First iteration

Let say $x=1$;

$\eta = 0.1$ (learning rate)

$\frac{df}{dx}$ at $x=1$

$$\frac{df}{dx}(1) = 4(1)^3 + 6(1)$$

$$f'(1) = 10$$

The New x value will be

$$x = x - \eta f'(1)$$

$$x = 1 - 0.1(10)$$

$$x = 1 - 1$$

$$x = 0$$

Second iteration

$$x = 0$$

$$f'(x) = 4(0)^3 + 6(0)$$

$$= 0$$

The new value does not change.

$$x = 0 - 0.1(0)$$

$$x = 0$$

Because, it is the global minimum point

The value of $f(x)$ at $x = 0$ is.

$$f(0) = (0)^4 + 3(0)^2 + 10$$

$$= 10$$

∴



Shot on OnePlus

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