

NNDL Assignment-1

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

→ Manual calculations

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

$$\text{let } x=2 ; \eta = 0.01$$

$$\frac{\partial f(x)}{\partial x} = 4x^3 + 6x$$

$$\begin{aligned} \textcircled{1} \rightarrow \frac{\partial f(x)}{\partial x} \Big|_{x=2} &= 4(2)^3 + 6(2) \\ &= 44 \end{aligned}$$

$$\begin{aligned} \Delta x &= -\eta(44) \\ &= -0.01(44) \\ &= -0.44 \end{aligned}$$

$$\begin{aligned} \rightarrow x &= x + \Delta x \\ &= 2 - 0.44 \\ &= 1.56 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad \frac{\partial f(x)}{\partial x} \Big|_{x=1.56} &= 4(1.56)^3 + 6(1.56) \\ &= 24.545 \end{aligned}$$

$$\begin{aligned} \Delta x &= -0.01 \times 24.54 \\ &= -0.2454 \end{aligned}$$

$$\begin{aligned} x &= x + \Delta x \\ &= 1.56 - 0.2454 \\ &= 1.314 \end{aligned}$$