Feb 21, 2021 NNDL Assignment - 1

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1) Find the global minimum point and value for the function.

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

i) Manual calculations for two iterations.

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

Let $x = 2$, $\eta = 0.01$

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

For iteration 1

$$\left.\frac{\partial f(x)}{\partial x}\right|_{x=2} = 4(2)^3 + 6(2)$$

$$= 32 + 12 = 44 \qquad \Delta x = -\eta * \frac{\partial f(x)}{\partial x}$$

$$\Delta x = -(0.01)(44) = -0.44$$

$$x = x + \Delta x$$

$$x = 2 - 0.44 = 1.56$$

For iteration 2

$$\left.\frac{\partial f(x)}{\partial x}\right|_{x=1.56} = 4(1.56)^3 + 6(1.56)$$

$$= 4(3.796) + 9.36$$

$$= 24.54$$

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

$$\Delta x = -(0.01)(24.54) = -0.2454$$

$$x = x + \Delta x$$

$$x = 1.56 - 0.24$$

$$x = 1.314$$

This procedure will be repeating until gradient is near to zero.