20/2/21

* NNDL Assignment - 1 *

18k41A0415

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

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

→ Manual Calculations for two iterations

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

let $x = 2$; $\eta = 0.01$ (learning rate)

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

For 1 iteration

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

$$= 32 + 12 = 44$$

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

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

$$x = x + \Delta x$$

$$x = 2 - 0.44 = 1.56$$

For 2 iteration

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

$$= 24.54$$

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

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

$$x = x + \Delta x$$

$$x = 1.56 - 0.24$$

$$x = 1.314$$

This procedure is repeating until gradient is near to zero.