NNDL Assignment

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

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

Let $x = 2$

$\eta = 0.01$ (learning rate)

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

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

$$= 32 + 12 = 44$$

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

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

$$= -0.44$$

$$x = x + \Delta x$$

$$x = 2 - 0.44$$

$$= 1.56$$

Iteration 1

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

$$= 24.54.$$

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

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

$$x = x + \Delta x$$

$$x = 1.56 - 0.24$$

$$x = 1.314$$

Iteration 2

⋮

This procedure is going to repeat until the gradient is near to zero.