# Assignment - 2

⇒ Manual calculation for $f(x) = x^4 + 3x^2 + 10$

## Iteration - 1

Choose initial values for $x$, let $x = 2$ and $\eta = 0.001$.

Gradient at $x = 2$ i.e. $\frac{\partial f(x)}{\partial x}\Big|_{x=2}$

$= 4(2)^3 + 6(2) = 44$

$\Delta x = -0.001 \times 44 = -0.044$.

Update $x$ value as $x = 2 - 0.044 = 1.956$

## Iteration - 2

Gradient at $x = 1.956$ i.e $\frac{\partial f(x)}{\partial x}\Big|_{x=1.956}$

$= 4(1.956)^2 + 6(1.956)$

$= 41.670$.

* As gradient not near to Zero. Calculate step length $\Delta x = -0.001 * 41.670$.

$= 0.0416$.

* Update $x$ value as $x = 1.956 - 0.0416 = 1.91$

→ This procedure is repeating until gradient is near to Zero.