

## 2.2 Root Finding

### 2.3 Newton's Method

Given a function  $f(x)$  which is once continuously differentiable and its derivative  $f'(x)$  is inexpensive to evaluate, we would use **Newton's Method** to numerically find the root of  $f(x)$ .

#### 2.3.A Fixed Point Method

Given a function  $f(x)$  which is Lipschitz continuous with constant  $0L < 1$ , we would use the **Fixed Point Method** to numerically find the root of  $f(x)$ .

#### 2.3.B Bisection Method

Given a function  $f(x)$  which is once continuously differentiable and its derivative  $f'(x)$  is expensive to evaluate, we would use the **Bisection Method** to numerically find its root as computing the derivative is not required for the Bisection Method to find the root of  $f(x)$ .

#### 2.3.C Bisection Method

Given a function  $f(x)$  which is continuous but not differentiable, we would use the **Bisection Method** to numerically find its root, as once again, computing the derivative of  $f(x)$  is not required for the Bisection Method to find the root of  $f(x)$ .