# Bisection Method

Advantages

1. Since the bisection method discards 50% of the current interval at each step, it brackets the root much more quickly than the incremental method does.

To compare:

* On average, assuming a root is somewhere on the interval between 0 and 1, it takes 6-7 function evaluations to estimate the root to within 0.1 accuracy.
* Those same 6-7 function evaluations using bisection estimates to root to within ½^4=0.625 to ½^5=0.031 accuracy

1. Simple and easy to implement
2. One function evaluation per iteration
3. The number of iterations can be determined a prior
4. No knowledge of the derivatives is needed
5. The function does not have to be differentiable

Disadvantages

* Slow to converge
* Good intermediate approximation may be discarded
* Like incremental search, the bisection method only finds roots where the function crosses the x axis. It cannot find roots where the function is tangent to the x axis.
* Like incremental search, the bisection method can be fooled by singularities in the function.
* Like incremental search, the bisection method cannot find complex roots of polynomials.

# Newton Raphson Method

Advantages

* One of the fastest methods which converges to root quickly
* Converges on the root quadratically i.e rate of convergence is 2
* As we go near to root, number of significant digits approximately double with each step
* It makes this method useful to get precise results for a root which was previously obtained from some other convergence method
* Easy to convert to multiple dimension

Disadvantages

* We must to find the derivative to use this method
* Poor global convergence properties
* Dependent on initial guess

1. May be too far from local root
2. May encounter a zero derivative
3. May loop indefinitely

# False Position Method

Advantages

* It does not require the derivative calculation
* This method has first order rate of convergence i.e. it is linearly convergent. It always convergence

Disadvantages

* As it is trial and error method in some cases it may take larger time span to calculate the correct root and thereby slowing down the process
* It is used to calculate only a single unknown in the equation