

Chapter 2 Solutions of Equations in One Variable

In this chapter we shall study methods for solving (approximately) the equation

$$f(x) = 0 \quad p \begin{cases} \nearrow \text{root} \\ \rightarrow \text{zero} \\ \searrow \text{solution} \end{cases}$$

If p is a solution of this equation, then we shall use the so-called iterative methods which generate

x_0, x_1, x_2, \dots
such that

$$\lim_{n \rightarrow \infty} x_n = p$$

2.1 Bisection Method

1) The Bisection Method

The Bisection Method is based on the Intermediate Value Theorem.

Suppose: $f(x)$ - continuous on $[a, b]$
with $f(a) < 0$ $f(b) > 0$
or $f(a) > 0$ $f(b) < 0$