

False Position (Regula Falsi) Method

Theory:

The False Position Method also belongs to bracketing methods and requires an initial interval where the function changes sign. However, instead of selecting the midpoint as in the Bisection Method, this method estimates the root using a straight-line approximation between the endpoints.

The root is approximated using the formula,

$$x_0 = x_1 - f(x_1) * \frac{x_2 - x_1}{f(x_2) - f(x_1)}$$

By using linear interpolation, the False Position Method often converges faster than the Bisection Method, especially when the function behaves nearly linearly near the root. However, in some cases, one endpoint may remain unchanged for many iterations, which can slow convergence.

In comparison to Bisection, this method provides better approximations in fewer steps, while still maintaining the safety of bracketing. However, it is generally slower than open methods such as Newton-Raphson and Secant.