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NUMERICAL METHODS OF HYBRID ROOT FINDING IN SOLVING NON-LINEAR EQUATION

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ABSTRACT

This study analyses and compares the performance of traditional, modified and hybrid root-finding methods in solving non-linear equations. The traditional root-finding methods involve Bisection method, False Position method and Secant method, while the modified root-finding method involve Trisection method, Modified False Position method and Modified Secant method. In addition, hybrid root-finding methods which are Hybrid Bisection–False Position, Trisection–False Position, Bisection–Modified False Position, Trisection–Modified False Position and Secant–False Position are implemented to assess whether combining methods improves accuracy, reliability and efficiency. A set of combination of non-linear functions which involve various complexity forms are used to evaluate each method. Each method is tested using the same stopping criteria based on accuracy TOL 10^{-6}, CPU time and number of iterations. Numerical results show that hybrid and modified methods often outperform their traditional counterparts in terms of speed and robustness. This research provides valuable insights into the effectiveness of combining numerical techniques to enhance root-finding performance for non-linear problems.

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