South East Asian J. of Mathematics and Mathematical Sciences
Vol. 20, No. 2 (2024), pp. 269-282

DOI: 10.56827/SEAJMMS.2024.2002.20 **ISSN (Online): 2582-0850**

ISSN (Print): 0972-7752

RESOLVING NONLINEAR PHYSICS PROBLEMS WITH AN EFFICIENT SEVENTH ORDER ITERATIVE APPROACH

Ashu Bahl, Ranjita Guglani and Rajni Sharma*

Department of Mathematics,
DAV College, Jalandhar, Punjab, INDIA

E-mail : bahl.ashu@rediffmail.com, ranjitakapur@gmail.com

*Department of Applied Sciences,
DAV Institute of Engineering and Technology,
Jalandhar, Punjab, INDIA

E-mail : rajni_daviet@yahoo.com

(**Received:** *Feb. 06, 2024* **Accepted:** *Aug. 28, 2024* **Published:** *Aug. 30, 2024)*

Abstract: Our research introduces a novel seventh-order iterative method specifically designed to address nonlinear equations having multiple roots. Inspired by the pioneering work of Sharma et al. (2019), our approach represents a significant advancement in computational techniques for solving complex mathematical problems. Through rigorous convergence analysis, we establish that our proposed method achieves seventh-order convergence. To evaluate its efficacy, we conduct extensive numerical experiments utilizing a range of nonlinear equations encountered in applied physics domains, including Planck's Law, electron trajectory problems, and Newton's beam designing problem. Our findings reveal that the suggested method consistently outperforms other existing techniques of similar nature available in the literature. Notably, our method demonstrates exceptional convergence behavior even in challenging scenarios involving multiple roots, indicating its suitability for solving complex problems encountered in applied physics and related fields. This superiority is evidenced by its ability to efficiently converge to solutions even in scenarios involving multiple roots. The practical implications of our research extend to various fields reliant on nonlinear equation.