Review of: "New Computational Methods Using Seventh Derivative Type for the Solution of First Order Initial Value Problems"

Sonia Bhalla

Potential competing interests: No potential competing interests to declare.

The authors constructed the new computational methods using a seventh derivative type for the solution of first-order initial value problems. The following points should be clarified before the acceptance of the paper.

1. The proposed methods have tenth order of convergence with the computation of seventh-order derivatives, but a higher order derivative leads to more computation time, and computation time plays a significant role in the solution of real-world problems.
2. In the derivation of methods, step number k=2 is considered, but in the computation of P, some terms are general and some are with k=2. Moreover, the X vector contains the last term a(k+8), in which Q f', f(2), f(3)……. are used in equations (3) to (7), g, u, v, w, m, and q are used. Why are the last terms the same in Q? Rewrite the P, Q, and X.
3. In the linear multi-step method equation (9), some summation terms do not have an upper limit. How is a0=1 calculated? Why are ξ =1 and 2 considered?
4. In Equation (25), it seems that h is missing.
5. In linear stability, is there any condition on λ?
6. Mention the Jacobian matrix f'(y_n+i) with the clear variables used for the same in the Newton-Raphson method.
7. In all numerical calculations, h=0.1 or 0.01 is used. Why not the other?
8. The comparisons are done with [9] of order 10, [15] of order 8, [18] of order 10, [32] of order 13. Why is an 8th order method compared with 10th order methods? Compare all [9], [18], [32] used for all examples.
9. Calculate the computation time in examples 1-5.
10. Rewrite the references. Most references use DOI numbers or site links.