

# Review of: "New adaptative numerical algorithm for solving partial integro-differential equations"

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**Potential competing interests:** No potential competing interests to declare.

## Positive Points:

1. The abstract and introduction clearly outline the paper's objective of introducing a numerical approach based on orthonormal Bernoulli polynomials for solving parabolic partial integro-differential equations (PIDEs). The paper contributes to the field by providing operational matrices and a transformation strategy for solving PIDEs, enhancing the understanding of numerical techniques in this domain.
2. The paper establishes a solid theoretical foundation by introducing operational matrices for orthonormal Bernoulli polynomials. This adds mathematical rigor to the proposed numerical approach, contributing to the credibility of the presented method.
3. The approach's transformation of the PIDE problem into a nonlinear algebraic system is well-explained, simplifying the computational process and providing clarity in the methodology.
4. The inclusion of a convergence analysis is commendable, providing insights into the reliability and accuracy of the proposed numerical algorithm. This analysis enhances the paper's scientific rigor.
5. The paper goes beyond presenting the proposed technique by including a comparison with other well-known methods. This comparative analysis adds value by benchmarking the new approach against existing ones, aiding readers in assessing its effectiveness.
6. The conclusion appropriately highlights the versatility of the proposed algorithm, indicating its potential application to various types of PIDEs and differential equations. This broad scope enhances the practical utility of the presented methodology.
7. The inclusion of numerical results and test problems, along with comparisons with other algorithms, is a positive aspect. It provides practical evidence of the proposed approach's efficiency and effectiveness.
8. The paper emphasizes that the presented method is easily implementable and simple, making it accessible to a broader audience and promoting its practical usability.
9. The conclusion encourages the extension of the proposed algorithm to more dimensions, showcasing a forward-thinking approach and suggesting potential avenues for future research.

10. The introduction provides a comprehensive review of existing literature, establishing a context for the paper and showcasing the authors' awareness of relevant research in the field.

Points of improvement:

1. While the abstract and introduction provide a clear overview, some terminology, such as "pseudo-spectral method," could benefit from additional clarification to ensure a more accessible understanding for readers.
2. The paper could benefit from a more detailed explanation of the proposed methodology, providing step-by-step procedures for readers to follow. This would enhance the paper's educational value.
3. While the paper compares the proposed technique with other methods, a more extensive comparative analysis, including a broader range of existing approaches, could strengthen the paper's argument regarding the novelty and superiority of the introduced method.
4. The paper does not explicitly discuss any limitations or potential drawbacks of the proposed approach. Including a discussion of limitations would provide a more balanced perspective and guide future research directions.
5. While the paper mentions the application of the approach to "some test problems," providing specific examples and their detailed solutions would enhance the practical understanding of the proposed methodology.
6. The paper lacks a discussion on the computational efficiency of the proposed method. Including details on computation time or resource requirements would provide insights into the practical feasibility of the approach.
7. Incorporating visual representations, such as graphs or figures, to illustrate the convergence analysis or numerical results would enhance the paper's clarity and make it more accessible to a broader audience.
8. The paper could benefit from a more detailed explanation of key parameters used in the methodology, such as the choice of Gauss-Legendre nodes, to provide readers with a deeper understanding of the method's intricacies.
9. Some in-text citations lack specific details, making it challenging for readers to locate the referenced works. Ensuring comprehensive citations would enhance the paper's transparency and facilitate further exploration by readers.
10. The conclusion could benefit from a brief recapitulation of the main findings and contributions, reinforcing the significance of the presented approach and leaving a lasting impression on the reader.