Review of: "Bridging Classical and Computational Physics: Integrating Unsolvable Differential Equations into Undergraduate Education"

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Potential competing interests: No potential competing interests to declare.

I reviewed the manuscript; **Bridging Classical and Computational Physics: Integrating Unsolvable Differential Equations into Undergraduate Education;**

The author explored the significant gap in undergraduate physics curricula concerning unsolvable differential equations, despite their ubiquity in describing physical systems. Traditional educational frameworks often omit these equations due to their complexity and lack of analytic solutions, leaving computational methods underutilized in academic settings. By implementing computational calculus, this study demonstrates an accessible, straightforward method to handle such equations, supported by nine prototypical examples across classical physics domains. These include the three-body problem, rocket trajectories, electric circuit responses, and more. The approach is not only feasible for inclusion in high school and undergraduate courses but also enhances the conceptual understanding of physics through practical computation, proposing a foundational shift in physics education. The author has to address the following points:

1. The authors should carefully review the manuscript for any writing errors or mistakes that may be present.
2. The discretization technique discussed in Section 5 seems to align with existing literature; however, proper citation for this approach is needed.
3. The authors assert the development of the finite difference method. It is essential to elaborate on this scheme's stability and efficiency characteristics, especially in scenarios like evolution equations. Furthermore, addressing the scheme's stability under different conditions would be insightful.
4. While the authors compared their results with exact solutions, discussing and including comparisons with other numerical schemes is important.
5. It would be valuable to clarify if this scheme is tailored solely for single-domain problems or if it's adaptable to bidomain problems. Exploring the challenges and adjustments required for the latter scenario should be addressed.
6. The authors should elaborate on their rationale for pursuing a numerical solution approach rather than relying exclusively on exact solutions. Discussing the advantages and practical considerations driving this decision would add depth.
7. Consider mentioning robust techniques proficient in handling exact solutions. For example, the authors might include references to established methods like:

a) Symmetry analysis, conservation laws, and exact soliton solutions for the (n+1)-dimensional modified Zakharov–Kuznetsov equation in plasmas with magnetic fields;

b) Exact solutions for the Cahn–Hilliard equation in terms of Weierstrass-elliptic and Jacobi-elliptic functions;

c) Sensitive visualization, traveling wave structures, and nonlinear self-adjointness of the Cahn–Allen equation;

d) Conservation laws, exact solutions, and stability analysis for the time-fractional extended quantum Zakharov-Kuznetsov equation;

e) Abundant analytical solutions and diverse solitonic patterns for the complex Ginzburg–Landau equation.

8. The authors are encouraged to address all the points mentioned above in their manuscript. After revisions have been made, a revised version of the manuscript will be recommended for publication in the journal.