Review of: "An Alternative to the Merton Jump-Diffusion Model: A Simple, Explicit Formula"

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Potential competing interests: No potential competing interests to declare.

Overall Recommendation:

This paper introduces a new formula for option pricing that is claimed to be simpler and more intuitive than the Merton jump-diffusion model. The paper provides a brief overview of the limitations of existing jump-diffusion models and proposes a new method for solving partial integro-differential equations.

The core idea revolves around replacing the Merton model's infinite sum with a single term based on the Black-Scholes formula and introducing a new parameter φ^i. However, the explanation lacks details and rigor in certain areas.

Here's a breakdown of the strengths and weaknesses of the paper:

Strengths:

- **Potential for a simpler formula:** If the proposed formula can accurately price options with fewer complexities than the Merton model, it could be a valuable contribution.
- **Intuitive interpretation:** The paper claims that the new formula has a clearer intuitive meaning compared to the Merton model.

Weaknesses:

- **Lack of detailed explanation:** The paper skims over the derivation of the new formula and the justification for the parameter φ^i.
- **Missing proofs:** There's no mention of proofs for the validity of the new formula or the method for estimating φ^i.
- **Limited verification:** The verification relies on the continuity of a function, which might not be a strong enough argument.
- **Lack of novelty comparison:** The paper doesn't explicitly discuss how this method compares to other existing methods for simplifying the Merton model.

Additional points to consider:

- The paper mentions potential applications to other financial models, but these are not explored.
- The reference list seems to focus on jump-diffusion models and lacks citations that directly address the simplification of the Merton model.

Recommendations for improvement:

- Provide a more detailed explanation of the derivation of the new formula and the parameter φ^i.

- Include proofs for the validity of the formula and the method for estimating φ^i.

- Conduct a more rigorous verification process to validate the accuracy of the formula.

- Discuss how this method compares to other existing simplification methods for the Merton model.

- Consider including citations that address the simplification of the Merton model.

Overall, the paper presents an interesting idea but needs substantial improvement in terms of mathematical rigor and detailed explanations before it can be considered for publication in a top academic journal.