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Peer Review

Review of: "A connection between Gompertz diffusion model and Vasicek Interest Rate model"

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Review on the Paper: A Connection Between Gompertz Diffusion Model and Vasicek Interest Rate Model

The Significance and Originality of the Work: The idea of linking these two traditional diffusion processes is new and theoretically interesting because it provides a clean transformation between linear and nonlinear stochastic models, which could open new approaches in finance, biological growth, or even population modelling. However, the paper did not fully explore the implications or the potential applications of this transformation, which would add value to the contribution.

Technical Accuracy: The main mathematical arguments appear sound, and the use of Itô's Lemma is correctly applied in both transformation directions. That said, derivations are often rushed or incomplete. For example, the transition density functions are valid but could benefit from more explanation or intermediate steps; the derivation of the drift term in Section 3.1 should clearly show the application of Itô's formula to e^(x(t)).

The Presentation and Clarity: There are multiple grammatical errors and unclear phrasing in the paper. For example, "On the other hand" is written as "The other hand"; "Transformation the VIR model..." should be "Transforming the VIR model...". To ensure the English is academically appropriate and to improve the paper's flow, a thorough proofread would be highly beneficial. Additionally, the notation might be a bit dense at times and needs to be more clearly organized (for example, use boxed or numbered expressions for crucial functions).

Organization: Although the article is organized with a clear objective in mind, there are poor transitions between its many sections. Both the conclusion and the discussion part are lacking. Consider:

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Improving the structure by using clearer section headings, including brief summaries at the conclusion of significant subsections, and expanding the conclusion to incorporate recommendations for further research or theoretical implications.

Suggestions: For the following reasons, I suggest that the manuscript be subjected to major revision: Interesting and useful theoretical findings; Mathematical information that is reasonably accurate; Presentation, clarity, and formatting problems are serious.

With revision and stronger exposition, this paper could become a useful contribution to the literature on stochastic process modeling.

Declarations

Potential competing interests: No potential competing interests to declare.