

Review of: "Analysis of the Spread of Covid-19 via Atangana-Baleanu Fractional Derivatives"

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The proposed model is intriguing, and I anticipate significant results from the authors. However, I have some important questions to raise:

1. The statement "This motivates our choice of the Atangana-Baleanu derivative in our reformulated model" lacks justification.
2. About Remark 2: once the point a is fixed in Lemma 1, I believe that Remark 2 is not valid. Please see Section 2.2 in <https://rdcu.be/c0TGZ>, in which it is discussed that the sign of the fractional derivative does not imply monotonicity. I never worked with the ABD derivative, but I think it couldn't work as well. It is crucial to investigate this, as it is utilized in your Step 1 - Theorem 1.
3. The equilibrium point in your Section 4 indicates that all compartments are empty. However, I understand that the total population N remains constant. Specifically, from Eq. (2), $I=S=E_1=0$ in the equilibrium, but E_2 , D , R , and Q can assume any value (and should to sum up N), right?
4. In the results, I couldn't understand where you use the information "average life expectancy was 76.79 years [...] the estimated mortality rate is $\mu = 0.0048$."
5. Is the λ that varies in each figure λ_{33} ?
6. Can you ensure that the pink line in figures 5-8 will not approach infinity?
7. The paper contains several typos and requires revision.

I am confident that the authors can yield significant results by addressing these concerns. Good luck!