

# Review of: "Qualitative Analysis of a Time-Delay Transmission Model for COVID-19 Based on Susceptible Populations With Basic Medical History"

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Potential competing interests: No potential competing interests to declare.

## Summary of the Work

Modeling the dynamics of the model SARS-CoV2 described in Eq. (3) of the manuscript, taking into account the delay, is very important and topical. The authors determined the existence and stability of the equilibrium point and calculated the basic reproduction number. Numerical simulations confirmed the conclusions about the stability of the equilibrium point.

## General Remarks

- 1) Please double-check the English; small typos have been detected.
- 2) The list of works cited in the References is not exhaustive and should be completed

## Suggestions

*There are several points that need to be clarified*

- 3) In Eq. (1), please specify the meaning of the parameters  $\beta_1$ ,  $\beta_2$ ,  $\theta$ ,  $\sigma$ ,  $\gamma$ , and  $d$ .
- 4) Please, specify why the compartments Susceptible ("S<sub>1</sub>" and "S<sub>2</sub>") have been introduced and, please, explain the meaning of Compartment "A".
- 5) The dynamic equations 1) 2) and 3) in the authors' manuscript do not satisfy the conservation law. The authors are invited to clarify this aspect.
- 6) Please, clarify why in some equations governing the model 2) in the manuscript, the Compartment are subject to delay while in other equations the same Compartments are not subject to delay (e.g., the infectious Compartment "I" and the Susceptible Compartments "S<sub>1</sub>" and "S<sub>2</sub>").
- 7) Why do the Infectious and the Susceptible Compartments have the same delay  $\tau$ ?
- 8) The presence of the exponential factor in the dynamic equation governing infected people in Eq. 2) is quite obscure to me. Please clarify.

9) The effects of lockdown and quarantine were not considered in the model proposed by the authors. Yet such effects have a large impact on dynamics. This aspect also deserves attention and discussion by the authors.

10) We arrive at a crucial point. The authors should highlight what the added value of their results is compared to those appearing in the literature. From the authors' conclusions, this does not emerge clearly. There are only verbal recommendations not substantiated by mathematical and numerical simulation results. The authors are asked to take into consideration this point.

## Conclusions

The topic is interesting and topical. However, the model proposed by the authors contains many points that need clarification, some of which are mentioned in the above section "Suggestions". Authors are invited to take this advice into account.