

# Comparing epidemiological models with the help of visualization dashboards

Boróka Olteán-Péter

Sapientia Hungarian University of Transylvania

boroka.oltean@ms.sapientia.ro

In 2020, due to the *COVID* – 19 pandemic, various epidemiological models appeared in major studies [1, 2, 3, 4], which differ in terms of complexity, type, etc. In accordance with the hypothesis, a complex model, which takes into consideration more parameters, is more accurate and gives more reliable results than a simpler one.

In this paper we study three different epidemiological models: a *SIR*, a *SEIR* and a *SEIR* – *type* model. Our aim is to set up differential equation models, which rely on similar parameters, however, the systems of equation and number of parameters deviate from each other. A visualization dashboard<sup>1</sup> is implemented through this study, and thus, we are able not only to study the models but also to make users understand the differences between the complexity of epidemiological models, and ultimately, to share a more specific overview about these that are defined by differential equations [5].

In order to validate our results, we make a comparison between the three models and the empirical data from Eastern Italy and Wuhan, based on the infectious cases of COVID-19. To validate our results, we calculate the values of the parameters using the Least Square optimization algorithm.

## References

- [1] Q. Lin, S. Zhao, D. Gao, Y. Lou, S. Yang, S. S. Musa, M. H. Wang, Y. Cai, W. Wang, L. Yang, and D. He. A conceptual model for the coronavirus disease 2019 (covid-19) outbreak in wuhan, china with individual reaction and governmental action. *International Journal of Infectious Diseases*, 2020.
- [2] B. Tang, N. L. Bragazzi, Q. Li, S. Tang, Y. Xiao, and J. Wu. The effectiveness of quarantine and isolation determine the trend of covid-19 epidemics in the final phase of current outbreak in chine. *International Journal of Infectious Diseases*, 2020.
- [3] B. Tang, N. L. Bragazzi, Q. Li, S. Tang, Y. Xiao, and J. Wu. An updated estimation of the risk of transmission of the novel coronavirus (2019 ncov). *Infectious Disease Modelling*, 2020.
- [4] B. Tang, N. L. Bragazzi, Q. Li, S. Tang, Y. Xiao, and J. Wu. An updated estimation of the risk of transmission of the novel coronavirus (2019-ncov). *International Journal of Infectious Diseases*, 2020.
- [5] Robin N. Thompson. Epidemiological models are important tools for guiding COVID-19 interventions. *BMC Medicine*, 2020.

---

<sup>1</sup><https://seir-visualisation.vercel.app/>