

Biomathematics/Biomatemática

Impacts of individual behaviors on the spreading of an epidemic *via* hybrid models

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In this talk, we consider a class of hybrid problems, constructed to model the complex features of population dynamic problems, in which the microscopic individual behaviors and the macroscopic collective dynamics are closely intertwined, based in the work [1]. We consider a general hybrid model, obtained by coupling a system of ordinary differential equations and an agent-based process, which act simultaneously along a common timeline. The system of ordinary differential equations is embedded into a geographical network structure, so as to reproduce the spatial background of the population dynamics, which possibly present heterogeneous patterns and emergent properties; in parallel, the social interactions occurring between individuals are supported by a social network, which can be partly randomly generated. Finally, we apply the general model to the current COVID-19 pandemic.

References

- [1] CANTIN, GUILLAUME, SILVA, CRISTIANA J. AND BANOS, ARNAUD, *Mathematical analysis of a hybrid model: Impacts of*

individual behaviors on the spreading of an epidemic, Networks and Heterogeneous Media, vol. 17, no. 3, 333 - 357 (2022).