Modelling COVID-19 spreading in a network (Summary)

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1 Abstract

The usual simplified description of epidemic dynamics predicts an exponential growth. This is due to the mean field character of the dynamical equations of the SIR model. However, a recent paper (Thurner S, Klimek P and Hanel R 2020 Proc. Nat. Acad. Sci. 117, 22684) [3] showed that in a network with fixed connectivity, the nodes become infected at a rate that increases linearly rather than exponentially. Experimental data for COVID-19 seem to validate this approach. In this thesis we plan to study this model by tuning its parameters. In particular, we monitor the effect induced by a significant presence of hubs in the network. References used: [1], [2], [3]

References

[1] Neil Ferguson. Capturing human behaviour. *Nature*, 446:733, 05 2007.

[2] Romualdo Pastor-Satorras and Alessandro Vespignani. Epidemic spreading in scale-free networks. *Phys. Rev. Lett.*, 86:3200–3203, Apr 2001.

[3] Stefan Thurner, Peter Klimek, and Rudolf Hanel. A network-based explanation of why most covid-19 infection curves are linear. *Proceedings of the National Academy of Sciences*, 117(37):22684–22689, 2020.