Quantitative Biology > Populations and Evolution

Epidemics on a stochastic model of temporal network

Luis Enrique Correa Rocha, Adeline Decuyper, Vincent D Blondel

(Submitted on 24 Apr 2012)

Contacts between individuals serve as pathways where infections may propagate. These contact patterns can be represented by network structures. Static structures have been the common modeling paradigm but recent results suggest that temporal structures play different roles to regulate the spread of infections or infection-like dynamics. On temporal networks a vertex is active only at certain moments and inactive otherwise such that a contact is not continuously available. In several empirical networks, the time between two consecutive vertex-activation events typically follows heterogeneous activity (e.g. bursts). In this chapter, we present a simple and intuitive stochastic model of a temporal network and investigate how epidemics co-evolves with the temporal structures, focusing on the growth dynamics of the epidemics. The model assumes no underlying topological structure and is only constrained by the time between two consecutive events of vertex activation. The main observation is that the speed of the infection spread is different in case of heterogeneous and homogeneous temporal patterns but the differences depend on the stage of the epidemics. In comparison to the homogeneous scenario, the power law case results in a faster growth in the beginning but turns out to be slower after a certain time, taking several time steps to reach the whole network.

Subjects: **Populations and Evolution (q-bio.PE)**; Physics and Society (physics.soc-ph)

Cite as: **arXiv:1204.5421 [q-bio.PE]**

(or **arXiv:1204.5421v1 [q-bio.PE]** for this version)

Submission history

From: Luis Enrique Correa da Rocha Mr [view email]

[v1] Tue, 24 Apr 2012 16:11:55 GMT (1045kb,D)

Which authors of this paper are endorsers?