
Winning the competition: enhancing counter-contagion in SIS-like Markov processes

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Abstract

In this study we introduce a new SIS-like model of network diffusion where the probability rate functions can depend not only on the states of the nodes neighborhoods but on the whole network state. The model allows also competitive scenarios, where there are two states both diffusive. In this framework, we propose an efficient dynamic algorithm, Generalized Largest Reduction in Infectious Edges (gLRIE), that enhances the counter-contagion by allocating treatments. The algorithm is generalized to the case of network with hierarchical cluster structure. We perform simulations for a large set of parameters on random and real networks and compare the results with competitors from literature. The same idea was also applied in the different setting of deterministic SIS model in metapopulation and analysed in the framework of optimal control theory.

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