

A stochastic epidemic on a simplicial complex

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Complex networks with pairwise connections have been vastly used for the modeling of interactions within systems. Although these type of models are capable of capturing rich structures and different phases within a great variety of situations, their lack of explicit higher order interactions might result, in some contexts, limited. In this work a stochastic epidemic model on a simplicial complex is defined, generalizing a continuous time Markovian SIR epidemic process on networks. The stochastic microscopic process is studied by direct simulations and a homogeneous mean field description is developed, and its behavior is compared on networks versus simplicial complexes. The simple dissipative SIR infection dynamics permits a thorough characterization of the epidemic for arbitrarily high order interactions. Epidemic processes on simplicial complexes have been considered before, in their SIS [1, 2, 3] and SIRS variants [4]. The goal is to showcase the impact of higher order interactions in a contagion process by generalizing the epidemic model from networks to simplicial complexes.

References

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