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Spectral Analysis of Virus Spreading in Random Geometric Networks

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In this paper, we study the dynamics of a viral spreading process in random geometric graphs (RGG). The spreading of the viral process we consider in this paper is closely related with the eigenvalues of the adjacency matrix of the graph. We deduce new explicit expressions for all the moments of the eigenvalue distribution of the adjacency matrix as a function of the spatial density of nodes and the radius of connection. We apply these expressions to study the behavior of the viral infection in an RGG. Based on our results, we deduce an analytical condition that can be used to design RGG's in order to tame an initial viral infection. Numerical simulations are in accordance with our analytical predictions.

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