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MASTER'S THESIS PRESENTATION

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S-I-R Epidemic Process on Z^1/Z^2Graph—A Simulation Interpretation

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ABSTRACT

The classic S-I-R epidemic model describes the susceptible-infective-recovered epidemic process spreading on a group of people. The disease transmits from infective to susceptible through effective contact with probability p and the population is assumed to be constant and randomly mixing. In this paper, we are interested in the spreading pattern of the disease when the process is nearly critical and want to find out how the pattern changes with parametrization. We adjust the model to be neighborhood-contagious and did extensive simulations on $1-DZ^1$ graph and 2-D square lattice graph to visualize the process. We find that the process on 1-D graph strictly follows a line path with a specific slope and the slope is growing exponentially with the increase of transition probability and group size. For the 2-D case, we find the process evolves a path-connected square-circle when the group size is large and become fractal when the group size is small. Moreover, we also discuss about some other quantities which help interpret the spreading pattern, such as how the width of the infective changes with time and what the distribution of extinct time is where Z^1 is Z with superscript 1.
