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Empirical study of the role of the topology in spreading on communication networks

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Highlights:

• We considered city level networks as deduced from mobile call records, this way arriving at a distribution of connected components of different sizes. Using SI, the simplest spreading model, we studied spreading if only intra-city links were used and compared this situation with the case, when additional links participated in the process.

• We have found that, in spite of the complex structure of the empirical networks (broad degree distribution, communities), it is the average degree, which mainly determines the spreading speed.

• Introduction of bridges through inter-city and unidentified links, as well as presence of large degree nodes boosts spreading;

• Our model calculations suggest that community structure and regularity slows down the spreading. Moreover, bursty interaction patterns results in faster spreading compared to homogeneous exponential inter-event times.

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