

Rumours, epidemics and consensus on networks

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We study random processes on networks, focusing on particular on spreading dynamics of different kinds. The motivation for this study comes from two directions. On the one hand, decentralised algorithms for computation or co-ordination on large networks often build upon these simple primitives. On the other, they provide simple models to study the spread of information or behaviours on large social networks.

The course will begin by describing the processes of interest as Markov processes on networks. Typically, the Markov process is very easy to study on the complete graph, but the state space becomes very large on general networks. As a result, one needs to rely on a variety of bounds and approximations to make analysis tractable. We introduce a variety of techniques including coupling and comparison of Markov chains, and martingale methods, and apply them to these problems.