



Hamilton Institute

Cascade Dynamics on Complex Networks

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Abstract:

A cascade or avalanche is observed when interactions between the components of a system allow an initially localized effect to propagate globally. For example, the malfunction of technological systems like email networks or electrical power grids is often attributable to a cascade of failures triggered by some isolated event. Similarly, the transmission of infectious diseases and the adoption of innovations or cultural fads may induce cascades among people in society. It has been extensively demonstrated that such dynamics depend sensitively on the patterns of interaction laid out in the underlying network of the system. One of the primary goals of the study of complex networks is to provide a sound theoretical basis for this dependence.

In this seminar we discuss some recent progress in modelling the interaction between network structure and dynamics. Focusing on the phenomenon of high clustering, we present two recently proposed classes of random graphs that achieve non-zero clustering coefficients. We provide an analytically tractable framework for modeling cascades in both of these classes. This framework is then used to calculate the mean cascade size and the cascade threshold for a broad class of binary-state dynamics.

Venue: Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

Time: 2.00pm - 3.00pm

Travel directions are available at www.hamilton.ie

