



Warwick Centre for Predictive Modelling Seminar Series

## **Constructing and sampling graphs with specified joint-degree matrix**

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LIB1, Lower Level, Main Library

**Abstract:** Many real-world networks exhibit correlations between the node degrees. For instance, in social networks nodes tend to connect to nodes of similar degree. Conversely, in biological and technological networks, high-degree nodes tend to be linked with low-degree nodes. Degree correlations also affect the dynamics of processes supported by a network structure, such as the spread of opinions or epidemics. Proper modelling of these systems requires the sampling of networks with a specified set of constraints. I will present a solution to the sampling problem when the constraints imposed are the degree correlations. In particular, I will discuss an efficient and exact algorithm to construct and sample graphs with a specified joint-degree matrix, which determines the number of edges between all the sets of nodes for each degree. The algorithm always produces independent samples in polynomial time, without backtracking. These results allow researchers to achieve highly accurate modelling of complex systems of wide societal interest.

More info: <http://www2.warwick.ac.uk/fac/sci/wcpm/seminars>