Statistics and Actuarial Science Seminar

Title: Exploratory and confirmatory analysis of multivariate networks

Speaker: Termeh Shafie (University of Manchester)

Date: Thu 28th November 2019 at 3:00PM

Location: Seminar Room SCN 1.25

Abstract: Multivariate networks consist of a vertex set with at least one type of edge between pairs of vertices and with numerical and/or qualitative attributes on the vertices and the edges. These networks provide a more accurate representation of social structure than univariate networks, but analysing them introduce technical and computational complexity. This presentation will approach the analysis of multivariate networks in two parts. The first part is statistical entropy analysis of network data; a general exploratory method that can be used to analyse and test complicated dependence structures in the data. A systematic approach to entropy analysis of network data is shown, and the roles of different entropy tools are explained and illustrated with empirical examples. The second part of the presentation considers a multigraph representation of multivariate networks. Multigraph data structure is described with examples of their natural appearance, together with a description of the possibility to obtain multigraphs using blocking, aggregation and scaling. Two random multigraph models are presented and several statistics under these models are derived. It is shown how these statistics can be used to analyse local and global network properties in order to convey important social phenomena and processes.