

# The co-evolution of multiple networks

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## ABSTRACT

In this paper we present a family of statistical models for the co-evolution of multiple networks. The model is a natural extension of a version of the network evolution model developed by Snijders [1] to the case of multiple networks [2] with *realisation-dependent* model specifications [3]. The model characterizes multiple network co-evolution as a continuous time Markov process in which, at any moment in time there is a possible change in status of some randomly chosen network tie as a function of the multirelational “neighbourhood” of the tie. Snijders’ estimation approach [4] can be utilised to fit these co-evolution models to longitudinal observations on multiple networks. We argue that, just as network evolution models offer novel insights into the endogenous processes underpinning network formation, so these co-evolution models offer valuable insights into a variety of possible co-evolutionary network mechanisms. We illustrate application of the models and describe some important types of cross-network processes.

## Keywords

Analysis, statistical network models, network evolution, multiple networks

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