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INTRODUCTION

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This special issue is focused on 'evolution of social networks' which, we believe, is a fundamental topic for network analysts. The idea of coupling a special issue of this journal with an expanded and simultaneous book publication emerged during discussions at the 1994 Sunbelt Social Network Conference in New Orleans. We invited contributions from network analysts with research interests in network evolution and were delighted by their willingness to prepare contributions. Eight papers appear in this issue and the book version will have an additional three chapters.

We have made two rather simple assumptions: (i) there is a need for explicit dynamic models of social network processes and (ii) the social networks community is ready for them. Indeed, there are already some dynamic models of network processes. However, as the current literature on network dynamics and network evolution is rather scattered, it seemed useful to have a specific well defined and focused statement of the general problem(s). This special issue, together with the coupled expanded book version, is offered as a means for providing a coherent point of departure for future work.

We placed two constraints on the contributions: (i) they had to be formal models and (ii) these models had to be concerned with empirical phenomena. While this may appear restrictive, we stretched the definitions of these constraints. A 'formal model' can be an explicit mathematical model in the traditional sense or a set of explicit algorithmic statements of network process rules. 'Empirical' obviously includes data in the form of observed social network phenomena but we include also the generation of simulated data via theoretical models. In the long run, we expect that the two will be coupled: simulations can point to the kinds of data that need to be collected in empirical studies of social network phenomena. They also point to the kinds of data analytic tools that have to be established and mobilized. We note that while verbal formulations provide valuable insights into network processes, and are a rich source of ideas, they remain outside the scope conditions of this special issue—unless they are used to establish formal models.

There are four simulation studies, two empirical studies and two statistical discussions in this special issue. We start with the simulation studies. Flache and Macy focus on compliance and approval in small groups using exchange theory and rational actor models. Zeggelink et al. examine the emergence of subgroups and contribute to the theory of group formation. Skvoretz et al. focus on the generation of social structures. In the fourth contribution, Stokman and Zeggelink analyze policy networks in terms of power mechanisms and policy processes.

The next two contributions are empirical studies. Doreian et al. look closely at some through time mechanisms—reciprocity, transitivity and structural balance—for change in small group structure. Leenders considers friendship choices within a framework that couples structural balance and social exchange ideas. He uses a continuous time Markov model expressed in terms of differential equations.

It is clear that conventional statistical tools have limited utility in the face of the interdependencies of social network data. We have a clear need for new tools and both Snijders and Banks and Carley provide some. Snijders proposes general models for network evolution and offers a new estimation method based on the method of moments. He uses statistical simulation methods to estimate the theoretical moments. Banks and Carley describe a set of mathematical models for some theories concerning evolution of social networks and a statistical framework for estimating them.

The special issue closes with some remarks concerning future directions for studying social network processes through time.