A FRAMEWORK FOR TEMPORAL NETWORK ANALYSIS

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Statistical network analysis has become an important methodological framework for modeling and analysis of complex systems in a variety of domains. However, the majority of studies on complex networks rely on the assumption that the underlying topology is static, in which links between nodes are unchangeable. Many complex systems in nature are very dynamic, i.e., links are active only at certain points in time. Hence, new tools are required in order to describe and analyze the behavior of networks presenting temporal properties.

Actor-based models were introduced by Snijders [1] [2] under the assumption of statistical dependence between observations according to a continuous time Markov process. Estimates of the model parameters are obtained using method of moments and Robbins–Monro algorithm [3]. Our proposed framework is also based on the method of moments, however, it does not require any simulations of network structures. In order to validate the framework, we performed simulation experiments. Moreover, the proposed approach was applied to a real world data set, describing relationships between teenagers. Analytical and experimental results show that our proposed framework delivers promising results.

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References