Asymptotic theory in network models with covariates and a growing number of node parameters

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Received: 28 October 2020 / Revised: 22 April 2022 / Accepted: 13 July 2022 / Published online: 2 September 2022
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Abstract
We propose a general model that jointly characterizes degree heterogeneity and homophily in weighted, undirected networks. We present a moment estimation method using node degrees and homophily statistics. We establish consistency and asymptotic normality of our estimator using novel analysis. We apply our general framework to three applications, including both exponential family and non-exponential family models. Comprehensive numerical studies and a data example also demonstrate the usefulness of our method.

Keywords β-Model · Degree heterogeneity · Network homophily · Network method of moments

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