

Sampling and Estimation for (Sparse) Exchangeable Graphs

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Abstract

Many popular statistical models for network valued-datasets fall under the remit of the graphon framework, which (implicitly) assumes the networks are densely connected. However, this assumption rarely holds for the real-world networks of practical interest. Recent work has introduced sparse exchangeable graphs, and the associated graphex framework, as a natural generalization of the graphon framework to the sparse graph regime. These new models are formally defined as the set of random measures satisfying a particular notion of exchangeability. We develop the graphex framework as a tool for statistical network analysis by identifying the sampling scheme that is naturally associated with the models of the framework, and by introducing a general consistent estimator for the parameter underlying these models.