

1154-62-1103

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Estimation in the Sparse Popularity Adjusted Stochastic Block Model.

Consider a network with its adjacency matrix $A_{ij} \sim \text{Ber}(P_{ij})$. Since majority of real life networks are sparse, we consider the sparse PABM model. While majority of sparse network models are based on a rather unrealistic assumption that the maximum connection probability is bounded above by a small quantity, the flexibility of the PABM allows to model some of the probabilities of connections between the nodes as identical zeros. We estimate the probability matrix P . Our estimation technique involves the penalized optimization procedure. We estimate the matrix of the probability of connection between nodes by minimizing the squared differences between the blocks of the matrix A to its best rank one approximation over the set of all possible clustering matrix. We use the oracle inequality to find the upper bound of the estimation error and clustering error. (Received September 13, 2019)