

Limiting spectral distribution of stochastic block model

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Abstract

The stochastic block model, abbreviated to SBM, is a generative model for random graphs, which generates graph communities modeled by being connected with particular edge densities. For example, edges may be more common within communities than between communities. The SBM is important in statistics, such as clustering problems, machine learning, and complex network science, where it serves as a robust tool for recovering community structure in graph data. In this talk, we will introduce the SBM with two communities and present its empirical spectral distribution when the size of communities tends to infinity. It turns out that the limiting distribution is closely related to semi-circular law in the Wigner random matrices. The explicit limiting density function, along with a semi-circular approximation, and some applications will be given.

Keywords: Clustering, Semi-circular law, Spectral distribution, Stochastic block model.