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Shujie Ma* (shujie.ma@ucr.edu), University of California, Riverside, Riverside, CA 92525, and **Liangjun Su** and **Yichong Zhang**. *Determining the number of communities in degree-corrected stochastic block models.*

We propose to estimate the number of communities in degree-corrected stochastic block models based on a pseudo likelihood ratio. For estimation, we consider a spectral clustering together with binary segmentation method. This approach guarantees an upper bound for the pseudo likelihood ratio statistic when the model is over-fitted. We also derive its limiting distribution when the model is under-fitted. Based on these properties, we establish the consistency of our estimator for the true number of communities. Developing these theoretical properties require a mild condition on the average degree – growing at a rate of $\log(n)$, where n is the number of nodes. Our proposed method is further illustrated by simulation studies and analysis of real-world networks. The numerical results show that our approach has satisfactory performance when the network is sparse and/or has unbalanced communities. (Received September 03, 2019)