1125-62-1717 **Nikita Alexeev** and **Vishesh Karwa***, vkarwa@seas.harvard.edu, and **Debdeep Pati**, **Sonja Petrović**, **Mateja Raič**, **Liam Solus**, **Dane Wilburne**, **Robert Williams** and **Bowei Yan**.
Exact goodness-of-fit tests for Stochastic Block Models.

Stochastic Block models (SBM) with unknown block structure widely used to detect communities in real world networks. Testing the goodness of fit of such models is a challenging task due to the fact that the parameters of an SBM are usually estimated from a single observed network. Usual asymptotic tests are not valid. We develop a finite sample goodness-of-fit tests for three different variants of Stochastic Block models with unknown blocks. The finite sample test is based on the posterior predictive distribution of the SBM with unknown blocks. A key building block for sampling from this distribution is sampler from fibers of models with known block assignments. Sampling from these fibers is carried out using Markov bases. As intermediate results, we describe the Markov bases and the marginal polytope of Stochastic Block models with known block assignments. (Received September 19, 2016)