MANY PLAYER ASYMPTOTICS FOR MODELS OF STRATEGIC NETWORK FORMATION

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Abstract. We provide asymptotic approximations to the distribution of statistics that are obtained from network data for limiting sequences that let the number of nodes (agents) in the network grow large. Network formation is permitted to be strategic in that agents' incentives for link formation may depend on the ego and alter's positions in that endogenous network. Our framework does not limit the strength of these interaction effects, but assumes that the network is sparse. We show that the model can be approximated by a sampling experiment in which subnetworks are generated independently from a common equilibrium distribution, and any dependence across subnetworks is captured by state variables at the level of the entire network. Under many-player asymptotics, the leading term of the approximation error to the limiting model established in Menzel (2016) is shown to be Gaussian, with an asymptotic bias and variance that can be estimated consistently from a single network.

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