SCMS & SDS Joint Seminar

JOIN STATISTICS SEMINAR OF SCMS AND SDS

ESTIMATION OF EDGE DENSITY IN NOISY NETWORKS

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Lecture

Time: 4:00-5:00 pm., Thursday, June 7, 2018

Venue: Zibin N102, Fudan University

Abstract: Statistics, these numbers are rarely accompanied by some quantification of uncertainty. Yet any error inherent in the measurements underlying the construction of the network, or in the network construction procedure itself, necessarily must propagate to any summary statistics reported. Here we study the problem of estimating the density of edges in a noisy network, as a canonical prototype of the more general problem of estimating density of arbitrary subgraphs. Under a simple model of network error, we show that consistent estimation of such densities is impossible when the rates of error are unknown and only a single network is observed. We then develop method-of-moment estimators of network edge density and error rates for the case where a minimal number of network replicates are available. These estimators are shown to be asymptotically normal as the number of vertices increases to infinity. We also provide the confidence intervals for quantifying the uncertainty in these estimates based on the asymptotic normality. We illustrate the use of our estimators in the context of gene coexpression networks.

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