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Large deviations of subgraph counts for sparse random graphs

Abstract:

For fixed t > 1 and L > 3 we establish sharp asymptotic formula for the log-probability that the number of cycles of length L in the Erdos -
Renyi random graph G(N,p) exceeds its expectation by a factor t, assuming only that p >> log N/sqrt(N). We obtain such sharp upper tail
bounds also for the Schatten norms of the corresponding adjacency matrices, and in a narrower range of p=p(N), also for general subgraph
counts. In this talk, based on a recent joint work with Nick Cook, I will explain our approach and in particular our quantitative refinement of
Szemeredi’s regularity lemma for sparse random graphs in the large deviations regime.