Iterated Log Law for various graph parameters

Abstract:

We show that a version of the classical Iterated Log Law of Khinchin, and independently of Kolmogorov from the 1920's, holds for various parameters in the binomial random graph model and in a random 0/1 Bernoulli matrix. In particular, for a constant \( p \), we show that such a law holds for the number of copies of a fixed graph \( H \) in \( G(n,p) \), we show a similar statement for the number of Hamilton cycles in a random \( k \)-uniform hypergraph, provided that \( k \geq 4 \). In the graph case (that is, \( k=2 \)), since the number of Hamilton cycles in \( G(n,p) \), denoted by \( X_n \), does not converge to a normal distribution but rather tends to a log-normal distribution (as has been first proved by Janson), we show that a version of the Iterated Log Law holds for \( \log X_n \). We also obtain similar result for the permanent of a 0/1 bernouli random matrix.

No prior knowledge is required.

Joint with Daniel Motealegre and Van Vu.