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 results for the permanent of a 0/1 Bernoulli random matrix.

No prior knowledge is required.

Joint with Daniel Motealegre and Van Vu.