XI Brazilian School of Probability

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Conferences

Large Deviations Principle for the self-intersection local

Amine Asselah
Universite de Paris XII

Abstract: We estimate the probability a simple random walk intersects itself a large number of times in dimensions larger than 4. We also discuss what happens in $d = 3$.

Random conductance exclusion process

Claudio Landim
IMPA

Abstract: We prove the hydrodynamic limit of the one-dimensional random conductance exclusion process.

On the number of outstanding observations in a random sequence

F. Javier López
Dpto. Métodos Estadísticos. Universidad de Zaragoza

Abstract: Given a sequence of random variables we will consider several definitions of "outstanding observations". In particular, we will consider usual records (observations greater than the previous maximum), $k-$records (observations greater than the previous $k-$maximum), $\delta-$records (observations greater than the previous maximum plus a fixed real number δ), ties at the maximum (observations equal to the previous maximum) and $\delta-$ties at the maximum (observations at a distance smaller than δ from the previous maximum), among others. We will be interested in the number of these outstanding observations emerging from a sequence of independent identically distributed random variables.

Using a martingale approach, which connects our counting process with sums of minima in certain sequences of random variables, we will obtain weak and strong laws of large numbers as well as central limit theorems for the number of those outstanding observations. The conditions for the existence of such laws as well as the normalizing sequences will depend on the tail of the distribution of the original random variables which, in principle, will not be assumed to be of any specific form (for instance, discrete or continuous). Applications to well-known discrete and continuous distributions will be given.

Pinning models with quenched randomness: effect of disorder and Harris criterion

Fabio Toninelli
Laboratoire de Physique de l'ENS Lyon, CNRS

Abstract: I will consider models of directed polymers interacting with a 1-dimensional defect line in presence of quenched randomness. These models undergo a localization/delocalization transition. I will focus on the effect of disorder on the phase transition. Disorder is expected to be relevant or irrelvant according to whether a certain critical exponent of the homogeneous (non-disordered) model is positive or not. I will show how this can be proven rigorously: for the "relevance" part my talk will be based on joint work with G. Giacomin, for the "irrelevance" part on the recent math-ph/0701063, which gives a new method to prove earlier results by K. Alexander.

Fluctuation of Longest Common Subsequence

Heinrich Matzinger
Georgia Institute of Technology

Abstract: Optimal alignments (OA) and Longest Common Subsequences (LCS) are the main tools used in computation biology to identify similarity between various genetic sequences. OA and LCS can be viewed as a Last Passage Percolation (LPP) problem with correlated weights. We present some very recent results concerning the asymptotic order of the fluctuation of the LCS of two independent i.i.d. sequences. We do this for cases which are not low-entropy cases. This has only been possible for less than a year now.

Random walk in reversible random environment and connections to gradient fields

Marek Biskup
UCLA

Abstract: I will discuss some recent developments in the understanding of random walks on random resistor networks. The subjects of interest include proofs of quenched invariance principles, control of the decay of the heat kernel, non-Gaussian limits etc. Time permitting I will also make a connection to gradient fields and discuss a class of gradient fields with non-convex potentials for which the random walk techniques imply scaling to a Gaussian free field.

The k-core in random graphs.

Svante Janson
Uppsala University

Abstract: The k-core of a graph is the largest subgraph such that every vertex has degree at least k. We use a simple method, based on the convergence of empirical distribution functions, to study the size of the k-core in a random graph with given vertex degrees, and in particular to decide whether the k-core is empty or not (with high probability; the results are asymptotical as the size of the graph tends to infinity). As a corollary, we obtain a new, simple, proof of the theorem by Pittel, Spencer and Wormald on the threshold for existence of a non-empty k-core in the random graphs $G(n,p)$ and $G(n,m)$. (This is joint work with Malwina Luczak.)