June 23rd, 2006

945-10:00 Registration and Welcome

10:00-10:50 Anita Winter
University of Erlangen, Erlangen.
Evolving genealogical trees

Abstract

Kingman's coalescent describes genealogical relationships within an infinite population in equilibrium. We extend this statical picture by a dynamical one and study how genealogical relationships evolve in time. As a result we derive the diffusion limit of a tree-valued stochastic process as the solution of a well-posed martingale problem.
As a main tool we give an abstract notion of convergence in distribution of random metric spaces which are equipped with a probability measure in such a way that under a tightness condition convergence follows from convergence of all randomly sampled finite subspaces.
Applications to various questions in population genetics are possible. As an example we study the evolutionof the length of trees spanned by samples from the population.
The talk is based on joint work with Andreas Greven and Peter Pfaffelhuber.

11:00-11:30 Coffee Break

11:30-12:20 Nabin Jana
Indian Statistical Institute, Kolkata
Random Energy Models

Abstract

In this lecture, we reformulate the "Generalized Random Energy Model" (GREM), proposed by B. Derrida. We apply appropriate large deviation principle to get the free energy limit in this model. The driving distribution can go beyond the Gaussian (which is usually consider in the literature). Recently, Bolthausen and Kistler proposed a 'non-hierarchical' version of the model. Similar large deviation technique will give another proof for the existence of the free energy limit. An equivalent tree formulation of this non-hierarchical model will explain why the result wouldn't go beyond that of the usual GERM.

12:30-1:20 Antal Jarai
Carleton Univerity, Ottawa.
Random walk on a critical oriented percolation cluster in high dimensions

Abstract

We study simple random walk on a critical oriented percolation cluster in d + 1 dimensions, where $d > 6$, and show that it is subdiffusive. Our results confirm that the walk behaves qualitatively the same way as on a critical Galton-Watson tree conditioned to survive; a case studied by Kesten in 1986. Our percolation model has a finite range L that we take sufficiently large. We also believe that our results can be extended to the nearest neighbour case with d sufficiently large. We condition the cluster of the origin to survive for a long time n, and we let n go to infinity. Given the cluster, a random walk is started at the origin, and observed until it exits the ball of radius R. We show that the expected (annealed) exit time from the ball is of order R^3, and we obtain some further bounds on the rescaled distribution of the exit time.
Joint work with M. Barlow, T. Kumagai and G. Slade.

1:30-2:30 Lunch Break

2:30-3:20 Anish Sarkar
Indian Statistical Institute, Delhi.
Oriented Random Trees

Abstract

Consider the d-dimensional lattice $\mathbb{Z}^d$ where each vertex is 'open' or 'closed' with probability p or $1-p$ respectively. An open vertex v is connected by an edge to the closest (in L^1 distance) open vertex w such that the dth co-ordinates of v and w satisfy $w(d) \leq v(d)$. In case of non-uniqueness of such a vertex w, we choose any one of the closest vertices with equal probability and independently of the other random mechanisms. We shall describe properties of this random graph.

3:30-4:00 Coffee Break

4:00-5:00 Open Problems Session.

June 24th, 2006

10:00-10:50 Balint Toth

Institute of Mathematics, Technical University Budapest.

Hyperbolic hydrodynamic limits for two-component systems

Abstract

I will present two recent results in the context of the title. (1) Full hydrodynamic limit (valid beyond the appearence of shocks) for a two-component lattice gas. The PDE obtained is the so-called Leroux system. (Joint work with Jozsef Fritz.)
(2) Derivation of universal hydrodynamic limit valid for a large class of two-component interacting particle systems, describing the propagation of small perturbations of steady states.
(Joint work with Benedek Valko.)
The talk is based on the following two papers:
J. Fritz, B. Toth: Derivation of the Leroux system as the hydrodynamic limit of a two-component latice gas. Communications in Mathematical Physics, vol. 249, pp. 1-27 (2004)
B. Toth, B. Valko: Perturbation of singular equilibria of hyperbolic two-component systems: a universal hydrodynamic limit. Communications in Mathematical Physics, vol. 256, pp. 111-157 (2005)

11:00-11:30 Coffee Break

11:30-12:20 Gopal Basak

Indian Statistical Institute, Kolkata.

Phase III clinical trials, urn models and related asymptotics

Abstract

Adaptive data-dependent allocation designs are used in phase III clinical trials having two or more competing treatments with sequential entrance of patients, in order to allocate a larger number of patients to the better treatment. The odds ratio is a popular concept for biomedical practitioners, hence odds ratio based adaptive designs could be very useful in practice. Several such designs are available in the literature, e.g. Rosenberger et al. (2001) introduced them very briefly, however he did not study their theoretical properties. Here, we describe these designs by means of urn models, and establish rigorous limiting results for them.

12:30-1:20 R. Vasudeva

University of Mysore, Mysore.

On the almost sure bounds and Complete convergence bounds

Abstract

We study the almost sure and complete convergence bounds for sequences of partial sums , partial maxima and rth. maxima of sequences of i.i.d. random variables in relation to the associated boundary crossing.

1:30-2:30 Lunch Break

2:30-3:30pm David Wilson
Microsoft Research, Seattle.
Boundary conditions in trees and dimers

Abstract

We study groves on planar graphs, which are forests in which every tree contains one or more of a special set of vertices on the outer face, referred to as nodes. Each grove partitions the set of nodes. When a random grove is selected, we show how to compute the various partition probabilities as functions of the electrical properties of the graph when viewed as a resistor network. We prove that for any partition sigma, Pr[grove has type sigma] / Pr[grove is a tree] is a dyadic-coefficient polynomial in the pairwise resistances between the nodes, and Pr[grove has type sigma] / Pr[grove has maximal number of trees] is an integer-coefficient polynomial in the entries of the Dirichlet-to-Neumann matrix. We give analogous integer-coefficient polynomial formulas for the double-dimer model. These partition probabilities are relevant to multichordal $SLE_2, SLE_4, and SLE_8$. (Joint work with Richard Kenyon.)

3:30-4:00 Coffee Break

4:00-5:00 Open Problems Session.

June 25th, 2006

10:00-10:50 V.S. Borkar
Tata Institute for Fundamental Research, Mumbai.
Singularly perturbed ergodic control of diffusions

Abstract

We consider ergodic control of a diffusion with two time scales, a slow scale and a fast one characterized by a small parameter $\epsilon > 0$. It is shown that under suitable conditions, the averaged dynamics wherein the drift and diffusion coefficients of the slow dynamics are averaged over the asymptotic behaviour of the fast one, is a valid approximation to the original problem in the $\epsilon \to 0$ limit.

11:00-11:30 Coffee Break

11:30-12:20 Xiaowen Zhou
Concordia University, Montreal.
Coalescing Brownian motion, Arratia flow, and stepping-stone model on the circle

Abstract

Stepping-stone model is a mathematics model for population genetic. It describes the simultaneous evolution of interacting populations located over different sites, where each population consists of individuals of different types.
In this talk we will first go over some recent results on coalescing Brownian motion on the circle. Then we will give a new representation of the stepping-stone model on the circle using circular coalescing Brownian flow. Such a representation allows us to carry out some explicit computation. In particular, we find the distribution for the first time when there is only one type of individuals left across the circle.

12:30-13:20 Chris Burdzy
University of Washington, Seattle.
Shy couplings

Abstract

Suppose that the transition probabilities for a Markov process are given. If it is possible to construct two copies of the Markov process on the same probabilty space such that the two processes never come closer than some strictly positive distance then we call this pair of processes a "shy coupling". I will explain the motivation behind this research project. Then I will review examples of processes that admit shy couplings and examples where shy couplings do not exist. Joint work with I. Bejamini and Z. Chen

1:30pm Lunch