One-day probability meeting in honour of Harry Kesten

Sunday 20 November 2011, Cornell, Ithaca, NY, USA

Summary: The conference attracted an audience of about 30 people including graduate students from Cornell. The 5 main speakers gave superb presentations of cutting edge research often connected to or motivated by earlier work of Harry Kesten. Critical phenomena in statistical mechanics, shape theorems for growth models as well as percolation and its connections to SLE were among the problems discussed in the various talks.

Scientific content (highlights)

Study of the random cluster model near criticality:

We study the near-critical FK-Ising model. First, a determination of the correlation length defined via crossing probabilities is provided. Second, a striking phenomenon about the near-critical behavior of FK-Ising is highlighted, which is completely missing from the case of standard percolation: in any monotone coupling of FK configurations ωp (e.g., in the one introduced in [Gri95]), as one raises p near pc , the new edges arrive in a fascinating self-organized way, so that the correlation length is not governed anymore by the amount of pivotal edges at criticality. In particular, it is smaller than the heat-bath dynamical correlation length determined in the forthcoming [GP].

We also include a discussion of near-critical and dynamical regimes for general random-cluster models. For the heat-bath dynamics in critical random-cluster models, we conjecture that there is a regime of q values where there exist macroscopic pivotals yet there are no exceptional times. These are the first natural models that are expected to be noise sensitive but not dynamically sensitive.

Logarithmic fluctuations for internal DLA:

Let each of n particles starting at the origin in Z2 perform simple random walk until reaching a site with no other particles. Lawler, Bramson, and Griffeath proved that the resulting random set A(n) of n occupied sites is (with high probability) close to a disk Br of radius $r = n/\pi$. We show that the discrepancy between A(n) and the disk is at most logarithmic in the radius.

Also: The evolving voter model, Percolation of words, Percolation as a noise, and Bond percolation on isoradial graphs.

Assessment of result and impact:

The 5 speakers presented superb results to a captivated audience. Posdoctoral associate and graduate student participant were exposed to some of the finest recent progress in probability theory, including recent developments regarding the relations between SLE and Statistical Mechanics. A remarkable variety of results were discussed and explained giving a very healthy picture of the state of this area of probability theory and its connection to Physics and other areas of Mathematics. Talks were followed by lively discussions.

Program:

Hugo Duminil-Copin (University of Geneva): Near-critical random-cluster model: beyond the pivotal sites phenomenon

Rick Durrett (Duke University): The evolving voter model

Geoffrey Grimmett (Cambridge University: Bond percolation on isoradial graphs

Lionel Levine (Cornell University): Logarithmic fluctuations from circularity

Vladas Sidoravicius (IMPA/Amsterdam): Percolation of words

Stanislav Smirnov (University of Geneva): Percolation as a noise

with an introduction by Laurent Saloff-Coste (Cornell University)