THE UNIVERSITY OF CHICAGO

Department of Statistics

DISSERTATION PROPOSAL

SUBHAJIT GOSWAMI

Department of Statistics
The University of Chicago

First Passage Percolation on the Exponential of Two-Dimensional Branching Random Walk

THURSDAY, November 12, 2015, at 10:00 AM
Eckhart 104B, 5734 S. University Avenue

ABSTRACT

We consider the branching random walk $\{\mathcal{R}_z^N : z \in V_N\}$ with Gaussian increments indexed over a two-dimensional box V_N of side length N, and we study the first passage percolation where each vertex is assigned weight $e^{\gamma \mathcal{R}_z^N}$ for $\gamma > 0$. We show that there exists $\epsilon > 0$ such that for $\gamma > 0$ sufficiently small but fixed, the expected FPP distance between the left and right boundaries is at most $O(N^{1-\epsilon\gamma^2})$.

In a broad context, our work is motivated by studying first passage percolation on random media with heavy correlation. The main contribution of our work, is to demonstrate an instance that in a hierarchical random field the exponent of the FPP distance can be strictly less than 1 (despite the fact that the a straight line has weight with exponent strictly larger than 1). This is, of course, rather different from the classical FPP where the edge/vertex weights are independent and identically distributed. A future research direction is to obtain similar result when the underlying field is Gaussian Free Field (GFF).

For information about building access for persons with disabilities, please contact Laura Rigazzi at 773.702-0541 or send an email to lrigazzi@galton.uchicago.edu. If you wish to subscribe to our email list, please visit the following web site: https://lists.uchicago.edu/web/arc/statseminars.