Yang XIAO

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Research Experience

Bootstrap of Compactified Imaginary Liouville Theory,
ongoing project with Colin GUILLARMOU, Antti KUPIAINEN, Rémi RHODES, and Yuxiao XIE.

Boundary Compactified Imaginary Liouville Theory, with Yuxiao XIE, on Arxiv soon.

➢**Abstract:** We generalize the construction of Compactified Imaginary Liouville Theory (CILT), a non-unitary logarithmic Conformal Field Theory (CFT) on closed surfaces, to Riemann surfaces with boundary. Starting from a compactified Guassian Free Field (GFF) with Neumann boundary condition, we perturb it with curvature terms and exponential potentials from the bulk and the boundary. In physics this theory is conjectured to describe scaling limit of loop models such as Potts and O(n) models. The potential terms are studied using imaginary Guassian Multiplicative Chaos (GMC). The curvature terms involve multivalued 1-forms are carefully regularized. We show this probabilistic path integral also satisfies axioms of CFT including Segal's gluing axioms. This work is a setup for future studies of boundary CILT, which will also improve the understanding of CILT.

Two projects are in cooperation with Dongjian QIAN, a doctoral student in FDU.

Speed of Random Walk in Dirichlet Environment (RWDE) on a Galton-Watson (GW) Tree

➢**Abstract:** This paper mainly deals with the transient RWDE, or equivalently the linearly **edge reinforced** random walk (ERRW), on a GW tree. We compute **stationary distributions** of the environment seen from the particle in both quenched and annealed cases. With these stationary measures, we provide the almost necessary and sufficient **criteria** for **positive speed** and give a **formula** of speed when it's positive.
https://arxiv.org/abs/2405.11845 (submitted to AIHP)

Scaling limit of the random walk on a *GW* tree with regular varying offspring distribution

➢ **Abstract:** We consider a random walk on a Galton Waston tree whose offspring distribution has a regular varying tail of order $\kappa \in (1,2)$. We prove the convergence of the renormalized **height function** of the walk towards the continuous-time height process of a spectrally positive strictly stable Lévy process, jointly with the convergence of the renormalized **trace** of the walk towards the **real tree** encoded by the latter continuous-time height process.
https://arxiv.org/abs/2309.09200 (accepted by ECP)

Education Background

Institut de Mathématiques de Marseille, Aix-Marseille Université, Marseille, France 10/2024-present
- Doctorant in Mathematics Supervisor: Prof. Colin Guillarmou & Rémi Rhodes

School of Mathematical Sciences, Fudan University (FDU), Shanghai, China 09/2021-06/2024
- M.S. in Probability, GPA: 3.9/4.0 Supervisor: Prof. Elie Aïdékon
- Main Courses: Modern Probability, Stochastic Analysis, Large Deviation, Functional Analysis, Modern PDE, Complex Analysis, Differential Geometry, Malliavin Calculus

Honor National Scholarship (top 10%)

School of Mathematics, Shandong University (SDU), Shandong, China 09/2018-06/2021
- B.S. in Statistics, GPA: 4.74/5.0

School of Computer Software, SDU, Shandong, China 09/2017-07/2018
Honor Academic Scholarship for Outstanding Students (top 5%)