University of Chicago Computational and Applied Math Student Seminar Fall 2022

The Gaussian Free Field: Properties and Applications

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Monday, October 10, 12-1 pm at Jones 303

Abstract

A Brownian motion can be thought of as a Gaussian random function of one variable, time. The Gaussian free field (GFF) generalizes the notion of a Gaussian random (generalized) function on domains $D \subset R^d$ for $d \geq 2$ with a covariance structure given by the Green's function of the Laplacian. In this seminar, I will show the construction of the GFF, give some of its properties, describe how it can be used to construct Liouville quantum gravity (LQG), and share some of the ways that these two objects are foundational to my research.