INSTITUTUL DE MATEMATICĂ “SIMION STOILOW” AL ACADEMIEI ROMÂNE

Seminarul de Teoria Potențialului

Backward Loewner Differential Equation as a Singular Rough Differential Equation, the welding homeomorphism and new structural information about the SLE traces

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Abstract: In this talk, I will give an overview of the Schramm-Loewner Evolutions (SLE) theory and present new results on this theory based on the analysis of a Singular Differential Equation that appears naturally in this context. This equation appears when extending the conformal maps to the boundary and can be thought of as a singular Rough Differential Equation (RDE), as in Rough Path Theory. In the study of RDEs, questions such as continuity of the solutions, the uniqueness/non-uniqueness of solutions depending on the behavior of parameters of the equation, appear naturally. We adapt these type of questions to the study of the backward Loewner differential equation in the upper half-plane, and the conformal welding homeomorphism. This view will allow us to obtain some new structural and geometric information about the SLE traces in the regime where they have double points. This part is a joint work with Dmitry Belyaev and Terry Lyons. If time allows, I aim to cover the main ideas of an independent project that uses ideas from Quasi-Sure Stochastic Analysis through Aggregation in order to study SLE theory quasi-surely. This quasi-sure study will allow us to overcome some of the difficulties with the previous analysis that I will emphasize throughout the talk