Potential Analysis Afternoon

January 26, 2023, Bucharest, Romania

ABSTRACTS

A counter example on the Feller semigroups and Markov processes

Lucian Beznea

We construct counter-examples showing that the strong Feller property for a semigroup of Markov kernels on a Lusin topological space is not enough to ensure the existence of an associated càdlàg Markov process on the same space. One such simple counter-example is the Brownian semigroup on $\mathbb{R}$ restricted to $\mathbb{R} \setminus \{0\}$, for which it is shown that there is no associated càdlàg Markov process. The talk is based on joint works with Iulian Cîmpean (Bucharest) and Michael Röckner (Bielefeld).

Multiplicity of solutions for a non-local problem with indefinite weights

Mounir Bezzarga

We establish the existence of at least three weak solutions for an intriguing system involving the Laplace operator.

On the singular value decomposition for the Poisson kernel

Iulian Cîmpean

In this talk we present a probabilistic numerical approach to approximate the (singular) spectrum of the operator which maps a given continuous function on the boundary of a bounded domain in $\mathbb{R}^d$ to the solution of the corresponding Dirichlet problem evaluated at a finite number of point locations inside the domain. This turns out to be an efficient tool to solve numerically the classical inverse Cauchy problem for heat conduction.

On a result concerning the balayage

Valentin Grecea

If J is a saturated, analytic gambling house, with compact sections, on a compact metric space E and if we consider on E two finite measures $Y < \Pi$, where $<$ is the order induced by J, then there exists sub-Markovian kernel P, admissible for J, such that Y equals the composition of Π with P.

Asymptotic behaviour of a one-dimensional avalanche model through a particular stochastic process

Oana Lupaşcu-Stamate

We develop the study of a binary coagulation-fragmentation equation which describes the avalanches phenomena. We construct first an adapted stochastic process and obtain its behaviour to the equilibrium. Our model is based on self-organized critical (SOC) systems and in particular on a simple sand pile model introduced in Bressaud and Fournier. Furthermore, we define a stochastic differential equation for this process and propose a numerical method in order to approximate the solution. The key point of our work is a new interpretation of the avalanches phenomena by handling stochastic differential equations with jumps and the analysis of the invariant behaviour of the stochastic process.

About the Gaussian moment conjecture

Ionel Popescu

The moment correlation conjecture is a general conjecture about a centered normal vector. I will talk about some of the attempts I had at this in collaboration with Giovanni Pecatti.