

SEMINARI DE PROBABILITATS
PROBABILITY SEMINAR
Universitat de Barcelona–Universitat Autònoma
de Barcelona

Facultat de Matemàtiques, Universitat de Barcelona
Gran Via de les Corts Catalanes, 585; E-08007 Barcelona
Aula/Room IMUB-Facultat de Matemàtiques, 2nd floor
4 p.m.

Titles and abstracts for the academic year 2006-2007

04/10/2006 Antoine Lejay, Institut Élie Cartan, Université Henri Poincaré, Vandoeuvre-lès Nancy, France

Introduction to rough paths

Abstract The theory of rough paths have proved to be useful tool for stochastic analysis, especially in a context different from the one of semi-martingales. This talk is then an attempt to present the last developments of this theory in an unified way, and to endow the importance of the required algebraic structures from basic considerations on ordinary integrals.

04/10/2006 Jeannette H.C. Woerner, University of Göttingen , Germany
On the sample path behaviour of stochastic processes: the Blumenthal-Gettoor index and the Hurst parameter

Abstract For stochastic modeling, specially in finance, turbulence and meteorology, an important feature is the behaviour of the sample paths of the underlying stochastic process. For jump processes the activity of the jumps can be measured in terms of the Blumenthal-Gettoor index, whereas for fractional Brownian motion the Hurst parameter determines the regularity.

We propose a class of easily computable estimators simultaneously for the Blumenthal-Gettoor index and the Hurst exponent, based on discrete observations. Furthermore, we derive consistency and a distributional result for these estimators and provide a graphical tool to distinguish between purely continuous processes and processes with jumps.

18/10/2006 Daniel Conus, EPFL, Lausanne, Switzerland

Random field solution to the non linear stochastic wave equation in high dimensions

Abstract In 1999, R.C. Dalang extends the stochastic integral with respect to martingale measures developed by Walsh (1984) to be able to integrate

non-negative Schwartz distributions. This extension allows him to find a random-field solution to the 3-dimensional non-linear stochastic wave equation in the case of a noise white in time and correlated in space. Under slightly stronger assumptions, we extend these results to integrate a more general class of Schwartz distributions. In particular, this class contains the fundamental solution of the wave equation in dimensions greater than 3. This leads to a square-integrable random-field solution to the non-linear stochastic wave equation in any dimension with the same noise as above. In the particular case of an affine multiplicative noise, we obtain estimates on p -th moments of the solution ($p > 1$), and we show that the solution is Hölder continuous of the same exponent as in the 3-dimensional case.

08/11/2006 Josep Lluís Solé, UAB, Barcelona, Spain

Sobre les martingales polinomials en espai /temps associades a un procés de Lévy

Abstract En aquest seminari estudiarem els polinomis $P_n(x, t)$ tals que $\{P_n(X_t, t), t \geq 0\}$ és una martingala, on $\{X_t, t \geq 0\}$ és un procés de Lévy. Veurem que apareixen bàsicament els anomenats polinomis dels cumulants. Els relacionarem amb els polinomis de Kailath-Segall i en treurem conseqüències.

22/11/2006 Florin Awram, Université Pau, Pau, France

Some degenerate exit problems of two-dimensional Lévy processes from the quadrant (joint work with Zbigniew Palmowski and Martijn Pistorius)

Abstract The one dimensional exact and asymptotic exit/ruin theory have been developed by Cramér and Lundberg as an application of Laplace's method. In several dimensions, this method breaks down; exact solutions are very rarely available, and even asymptotic expansions (beyond the large deviations logarithmic approximation) are not fully studied. We show that however exact analytic and asymptotic results are available for a certain class of "degenerate" multidimensional Lévy processes which appear in proportional reinsurance problems. Their study reduces to one-dimensional first-passage problems with piecewise-linear barriers.

29/11/2006 Florin Awram, Université Pau, Pau, France

On a Szegő type limit theorem for kernel-graph integrals, the Hölder-Young-Brascamp-Lieb inequality, and the asymptotic theory of integrals and quadratic forms of stationary fields

20/12/2006 Marta Sanz-Solé, Universitat de Barcelona, Barcelona, Spain

Analyzing a parabolic SPDE from an analytic and a stochastic point of view

Abstract: We study strictly parabolic stochastic partial differential equations on \mathbb{R}^d , $d \geq 1$, driven by a Gaussian noise white in time and coloured in space. Assuming that the coefficients of the differential operator are random, we give sufficient conditions on the correlation of the noise ensuring Hölder continuity for the trajectories of the solution of the equation. For self-adjoint operators with deterministic coefficients, the mild and weak formulation of the equation are related, deriving path properties of the solution to a parabolic Cauchy problem in evolution form. This is a joint work with Marco Ferrante, Padova, Italy.