# SEMINARI DE PROBABILITATS
# PROBABILITY SEMINAR
# Barcelona

## Titles and abstracts 7-28/06/2006

**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.**

**7/06/2006** Francesco Russo, Institut Galilée, Université Paris 13, Villetaneuse, France
*Stochastic calculus via regularisation, generalized Dirichlet processes and applications*

**Abstract**: We aim at presenting some aspects of stochastic calculus via regularization in relation with integrator processes which are generally not semimartingales. Significant examples of those processes are Dirichlet processes, Lyons-Zheng processes and fractional (resp. bifractional) Brownian motion. A Dirichlet process $X$ is the sum of a local martingale $M$ and a zero quadratic variation process $A$. We will put the emphasis on a generalization of Dirichlet processes. A *weak Dirichlet process* is the sum of local martingale $M$ and a process $A$ such that $[A, N] = 0$ where $N$ is any martingale with respect to an underlying filtration. Obviously a Dirichlet process is a weak Dirichlet process. We will illustrate partly the following application fields.

- Analysis of stochastic integrals related to fluidodynamical models.
- Stochastic differential equations with distributional drift and related stochastic control theory.

The talk will partially cover joint works with M. Errami, F. Flandoli, G. Trutnau.

**21/06/2006** El Hassan Essky, Université Cadi Ayyad, Safi, Morocco
*Backward stochastic differential equations: existence and uniqueness results*

**Abstract:** In 1990, Pardoux and Peng have established the existence and uniqueness of a solution of multidimensional backward stochastic differential equation (BSDE for short) under the uniform Lipschitz condition on the coefficient. This assumption is usually not satisfied in many problems as, for example, the classical pricing problem, so it is important to find weaker conditions under which the BSDE has a unique solution.

In this talk, we present Pardoux and Peng result which requires no more than basic stochastic calculus and give a positive answers to the question : are there any weaker conditions than the uniform Lipschitz one under which the BSDE has a unique solution?

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**14/06/2006** Frederic Utzet, Universitat Autònoma de Barcelona, Bellaterra, Spain
*Sobre els polinomis ortogonals associats als processos de Lévy*

**Abstract:** Let $X = \{X_t, t \geq 0\}$ be a cadlag Lévy process, centered, with moments of all orders. The Kailath–Segall formula gives the relationship between the iterated integrals and the variations of order $n$ of $X$, and defines a family of polynomials, $P_1(x_1)$, $P_2(x_1, x_2), \ldots$, that are orthogonal respect the joint law of the variations of $X$ . This family includes the Hermite and Charlier polynomials. On the other hand, we can construct a (finite or infinite) sequence of orthogonal polynomials $p_n(x)$ with respect to the measure $\sigma^2\delta_0(dx) + x^2\,\nu(dx)$, where $\sigma^2$ is the variance of the Gaussian part of $X$ and $\nu$ its Lévy measure. These polynomials determine a sequence of strongly orthogonal martingales that are the building block of a kind of chaotic representation for square functionals of the Lévy process proved by Nualart and Schoutens. The main objective of this talk is to study the relationship between the polynomials $P_n(x_1, \ldots, x_n)$ and $p_n(x)$. Also, the Lévy processes such that the polynomials $P_n(x_1, \ldots, x_n)$ depend on a fixed number of variables will be characterized.

**28/06/2006** Magnus Fontes, Lund University, Lund, Sweden
*Time periodic solutions of Burgers equation*