Probability Day 26.1.2011

Venue: Room 1.016 (Lipschitz-Saal), Endenicher Allee 60, 53115 Bonn

Program

time	
14.00-15.00	**Peter Friz (TU Berlin):** Gaussian Rough Paths
15.15-16.15	**Shahar Mendelson (Technion Haifa & Australian Nat. University):** Complexity measures in learning theory
16.15-17.00	**Coffee break**
17.00-18.00	**Michael Monoyios (University of Oxford):** Exponential valuation and hedging of basis risk with random parameters
19.00-	**Dinner at 'Die Ente'** (Address: Kaiserpassage, Martinsplatz 2a, 53113 Bonn)

Abstracts

Peter Friz: Gaussian Rough Paths

Abstract:
We will explain the basics of Gaussian rough path theory and
discuss (time permitting) two recent applications;
[Cass--Friz, Densities for RDEs under Hoermander's Condition, Annals
of Mathematics, 171 (3), 2010 no. 3)] and
[Hairer, Rough Stochastic PDEs; arXiv 2010].

Shahar Mendelson: Complexity measures in learning theory

Abstract:
One of the key features of a learning problem associated with a class of functions F defined on a probability space (Ω,μ), is that its "difficulty" can be translated to a question regarding some natural metric structures on F. Namely, whether natural random (empirical) structures endowed on F are a good approximation to the underlying deterministic structure given via μ. The answer to this question is given using various complexity parameters (for example, the combinatorial dimension, Talagrand's γ-functionals, etc), which can be used to measure the difficulty of the problem. We will present an overview of these parameters, and the way they can be used to link the deterministic and random structures endowed on the given class.

Michael Monoyios: Exponential valuation and hedging of basis risk with random parameters

Abstract:
We consider exponential utility-based pricing and hedging in a general continuous incomplete semi-martingale model, for an unbounded claim satisfying exponential moment conditions. Payoff decompostions and a price representation equation are established. We then analyse the valuation and hedging of a claim on a non-traded asset using a correlated traded asset under a partial information scenario, when the asset drifts are unknown constants. Using a Kalman filter and a Gaussian prior distribution for the unknown parameters, a full information model with random drifts dependent on both asset prices is obtained. This is subjected to exponential indifference valuation. An expression for the optimal hedging strategy is derived. The general price representation and payoff decompositions become semi-explicit, containing terms involving the indifference price and its derivatives with respect to the asset prices. Asymptotic expansions of the price and hedge, valid for small values of risk aversion, are obtained via PDE methods, and also using ideas of Malliavin calculus. Analytic and semi-analytic formulae for the terms in the expansion are obtained when the minimal entropy measure coincides with the minimal martingale measure. Simulation experiments are carried out which indicate that the filtering procedure can be beneficial in hedging, but sometimes needs to be augmented with the increased option premium, that takes into account parameter uncertainty, in order to be effective. Empirical examples are presented which conform to these conclusions.