

9:30 - 10:15 Jan Večeř · KPMS MFF UK, Prague, CZ
Portfolio Optimization with Multiple Benchmark - Stochastic Optimal Control Approach

10:20 - 11:05 Jan Pospíšil · University of West Bohemia, Plzeň, CZ
Unifying approach to several stochastic volatility models with jumps

In this talk we introduce a new unifying approach to option pricing under continuous-time stochastic volatility models with jumps. For European style options, a semi-closed pricing formula is derived using the generalized complex Fourier transform of the corresponding partial integro-differential equation (PIDE). There exist transforms for a wide set of possible option payoffs and once the so called fundamental transform of a given model is obtained it can be used to price different European options. By finding the fundamental transform of a general jump diffusion model we introduce a formula for a wide class of stochastic volatility models where several different kinds of jumps can be involved. We discuss the numerical performance of the proposed formula.

11:10 - 11:55 Nouredine Kouaissah · Tech. Univ. of Ostrava, CZ; Univ. of Bergamo, Italy
Conditional Expectation with Applications in Finance

This paper examines different financial applications of some conditional expectation estimators. Using non-parametric regression methods to estimate the conditional expectation, we distinguish and propose three distinct financial applications. In the first application, we use the conditional expectation to provide some theoretical motivations behind the use of the moving average rule as one of the most popular trading tool among practitioners. In the second application, we present different approaches to evaluate the presence of the arbitrage opportunities in the market. In this context, we propose alternative approaches to estimate the state price density using the conditional expectation estimators. In the last experiment, we discuss some methods to reduce the dimensionality of large scale portfolio problems.

12:00 - 14:00 lunch time J. Večeř↓

14:00 - 14:45 Natalie Packham · Frankfurt School of Fin. & Manag., Frankfurt, Germany
Static hedging under maturity mismatch

Can shorter maturity European options be statically hedged with longer maturity plain vanilla options? This problem appears for example when analyzing options on forwards in relation to liquid options on the spot underlying. Under mild assumptions on the underlying security price process and on the option's payoff function we show that approximate static hedges exist and we provide a recipe for constructing them. Examples illustrate the power of the hedge and its sensitivity to modelling assumptions. The results can be extended to formulating semi-static hedging strategies for discretely monitored path-dependent contingent claims.

14:50 - 15:25 Martin Šmíd · ÚTIA AS CR (AV ČR), Prague, CZ
On Distribution of Zero Intelligence Models and its Estimation by L_1 Data

A unit volume zero intelligence (ZI) model is defined and the distribution of its L_1 process is recursively described. Further, a generalized ZI (GZI) model allowing non-unit market orders, shifts of quotes and a general in-spread events is proposed and a formula for the conditional distribution of its quotes is given, together with a formula of for price impact. For both the models, MLE estimators are formulated and shown to be consistent and asymptotically normal. Consequently, the estimators are applied to data of six US stocks from nine electronic markets. It is found that more complex variants of the models, despite being significant, do not give considerably better predictions than their simple versions with constant intensities.

15:30 - 16:15 Tomáš Tichý · Technical University of Ostrava, CZ
Jiří Hozman · Technical University of Liberec, CZ
DG solver for 2D PDE models of Asian options: Theory and implementation

The presentation is focused on pricing of (Asian) options via numerical approach. After general introduction of the topic we extend a simple one-dimensional problem into two-dimensional one, design and analyze a scheme for valuation of these options, i.e. options with payoff depending on the average of prices collected over prespecified horizon. The whole algorithm is based on the approach combining the advantages of the finite element methods together with the piecewise polynomial generally discontinuous approximations. Finally, preliminary results of numerical experiments using German option market data are presented.

16:20 - 16:50 coffee break

J. Pospíšil

16:50 - 17:35 Petr Veverka · ÚTIA AS CR (AV ČR), Prague, CZErgodic maximum principle for infinite dimensional stochastic systems

In the talk, we provide a necessary and sufficient stochastic maximum principle for dissipative systems with additive noise in infinite dimension. The main difficulty consists in well posedness of the first adjoint backward equation which can be done by using some duality techniques. At the end, a relation to the formulation using invariant measure of the state system will be introduced.

17:40 - 18:25 Petr Čoupek · KPMS MFF UK, Prague, CZSEEs with non-Gaussian Volterra noise

In this talk, Volterra processes are considered to be centred stochastic processes with continuous sample paths and a covariance function of the form

$$R(s, t) = \int_0^{s \wedge t} K(s, r)K(t, r) dr.$$

Examples of such processes include the fractional Brownian motion (Gaussian) and the Rosenblatt process (non-Gaussian), and their relationship is briefly discussed. Subsequently, the attention is shifted to path properties of the mild solution of a linear stochastic evolution equation driven by a regular cylindrical Volterra process. In particular, sufficient conditions for measurability and Hölder continuity of its sample paths are presented. In this context, the effects of Gaussianity of the noise on continuity of the mild solution are discussed. This general theory is demonstrated on the particular example of the stochastic heat equation.

18:30 - 19:15 Karel Kadlec · KPMS MFF UK, Prague, CZErgodic Control in the Case of Cylindrical Lévy Processes

In this contribution, the cylindrical infinity-dimensional Lévy processes are considered and the weak solutions of the stochastic evolution equations with an infinitesimal generator and this Lévy noise are stated. The transformation for the control is also unbounded operator. Therefore f.e. boundary and point control fulfill these assumptions. The commonly known Itô formula is directly applicable only to the strong solutions of the stochastic evolution equations. The assumption of the existence of the strong solution is too restrictive, therefore the Itô formula in the suitable form for the weak solution of the stochastic evolution equation with the Lévy noise is stated. The LQ stochastic optimal control problem as well as the corresponding Ergodic control problem are formulated. Consequently, some Ergodic control results in the case of cylindrical Lévy processes as a noise are given.

19:30 - 22:00 dinner

Saturday 9.1.2016

9:30 - 9:45 tea

9:45 - 10:30 Viktor Beneš · KPMS MFF UK, Prague, CZU-statistics in spatial point processes and stochastic geometry

10:30 - 11:20 Petr Dostál · KPMS MFF UK, Prague, CZLog-optimal Investment in the Long Run with Transaction Costs - Shadow Prices Approach

11:25 - 11:50 Lev Klebanov · KPMS MFF UK, Prague, CZNo stable distributions in finance, please!

12:00 - 14:00 lunch time