
10:50 - 11:00 registration**V. Beneš↓**

11:00 - 11:50 Bohdan Maslowski · Math. Institute, AS CR (AV ČR), Prague, CZ ·***Ornstein-Uhlenbeck Bridge in Infinite Dimensions and Applications***

Some earlier and recent results on the OU Bridge obtained jointly by Ben Goldys and the speaker will be reviewed. The Hilbert space-valued OU Bridge will be defined and its basic properties will be listed. These results will be applied to the problem of existence and smoothness on transition densities of Markov processes defined by semilinear parabolic SPDEs. Some regularization properties of corresponding Markov transition semigroups and ergodic behaviour of the underlying processes will be also discussed.

12:00 - 12:50 Aleš Černý · City University London, UK***Mean variance hedging and optimal investment in Heston's model with correlation***

In this talk we use recent results on mean-variance hedging for general semimartingale processes to solve the mean-variance hedging problem in Heston's model with a stochastic opportunity set moving systematically with the volatility of stock returns. We allow for correlation between stock returns and their volatility (so-called leverage effect).

Our contribution is fourfold: using a new concept of opportunity-neutral measure we present a simplified strategy for computing a candidate solution in the correlated case. We then go on to show that this candidate generates the true variance-optimal martingale measure; this step seems to be partially missing in the literature. We derive formulas for the optimal hedging strategy and the hedging error. Finally, we reformulate the mean-variance hedging problem to obtain Sharpe ratio price bounds for any square-integrable contingent claim.

This is joint work with Jan Kallsen (CAU Kiel). Papers related to this talk are available at <http://ssrn.com/abstract=712743>, <http://ssrn.com/abstract=909305> and <http://ssrn.com/abstract=912952>.

13:00 - 14:30 lunch time**A. Černý↓**

14:30 - 15:20 Markus Reiss · Ruprecht-Karls-Universität Heidelberg, Germany***Nonparametric estimation for Lévy processes from low-frequency observations***

We suppose that a Lévy process is observed at discrete time points. A rather general construction of minimum-distance estimators is shown to give consistent estimators of the Lévy-Khinchine characteristics as the number of observations tends to infinity, keeping the observation distance fixed. For a specific C^2 -criterion this estimator is rate-optimal. The connection with deconvolution and inverse problems is explained. A key step in the proof is a uniform control on the deviations of the empirical characteristic function on the whole real line.

15:30 - 16:20 Jan Hannig · Colorado State University, USA***Continuum modeling of large networks***

This paper is concerned with the modeling and simulation of extremely large networks using time-dependent partial differential equations. The practical thesis of this paper is that global characteristics of sufficiently large networks can be captured by continuum modeling. Continuum modeling provides a powerful way to deal with the number of components in large networks, and opens up the use of highly sophisticated mathematical tools such as adaptive finite element methods. This, in turn, makes it possible to carry out—with reasonable computational burden even for very large systems—network performance evaluation and prototyping, network design, systematic parameter studies, and optimization of network characteristics.

Joined work with: Edwin Chong and Donald Estep

Thursday 3.1.2008

Chairman

16:20 - 16:50 coffee break

J. Hannig↓

16:50 - 17:40 Jan Swart · ÚTIA AS CR (AV ČR), Prague, CZ

The Brownian net

The (standard) Brownian web is a collection of coalescing one-dimensional Brownian motions, starting from each point in space and time. It arises as the diffusive scaling limit of a collection of coalescing random walks. It turns out that it is possible to obtain a nontrivial limiting object, called the Brownian net, if the random walks in addition branch with a small probability. In this talk, I will show how this ‘Brownian net’ can be defined and address some questions regarding its structure.

This is joint work with Rongfeng Sun and Emmanuel Schertzer.

17:50 - 18:40 Martin Ondreját · Math. Institute, AS CR (AV ČR), Prague, CZ

Stochastické vlnové rovnice v Riemannových varietách

Odvození rovnic, jejich význam, existence a jednoznačnost řešení.

18:50 - 19:20 Jakub Staněk · KPMS MFF UK, Prague, CZ

Obecný model vývoje epidemie

Příspěvek se zabývá modelem vývoje epidemie, který je popsán dvoudimenzionální stochastickou diferenciální rovnicí (SDE). Budou prezentovány základní vlastnosti řešení SDE a na konkrétních příkladech budou ukázána různá limitní chování řešení.

20:00 - 22:00 dinner

Friday 4.1.2008

Chairman

9:00 - 9:20 tea

M. Reiss↓

9:20 - 9:50 Petr Dostál · KPMS MFF UK, Prague, CZ

Almost optimal trading strategies for several assets

We consider an investor with HARA utility function who may invest in a money market and in a stock market with several assets with constant coefficients. We are interested in an almost optimal trading strategy for small transaction costs. We show that the task can be separated if there are independent groups of assets. We find the almost optimal strategy in case of independent stocks. Finally, we quantify the error of inaccurate solution in order to enable further studies. It follows that the (in) accurate almost optimal solution to the new task for the power utility investor can be obtained if we are able to find an (in) accurate almost optimal solution for the logarithmic utility.

10:00 - 10:50 Jitka Dupačová · KPMS MFF UK, Prague, CZ

Recent advances on financial applications of stochastic programming

TBA

11:00 - 11:50 Karel Janeček · RSJ Invest, a.s., Prague, CZ

Matching Algorithms of International Exchanges

The aim of this paper is to analyze different kinds of trade matching algorithms. The matching (or trade allocation) algorithm is an important part of an exchange trading mechanism. We begin with an overview of the matching algorithms currently used at the biggest world derivatives exchanges. Then we analyze the impact of these algorithms on the strategy of a rational trader, and derive implications of the induced trader’s behavior for the overall market efficiency. Our special focus is on the Time Pro-Rata algorithm introduced by Euronext.LIFFE in 2007 for the short-term interest rate futures contracts. Using rigorous mathematical models, we discuss how the optimal trading strategy should look like, and point out a number of unusual properties of this strategy. The obtained results might be interesting not only from the theoretical point of view, but also for a practical trader. Our analysis implies that the Time Pro-Rata algorithm substantially complicates decision making, and, more importantly, induces individually rational trader’s behavior that is inconsistent with the general market efficiency.

13:30 - 14:20 Jan Večeř · Columbia University, New York, USA

Tradeable Measures of Risk

The main idea of this talk is to introduce Tradeable Measures of Risk as an objective and model independent way of measuring risk. The present methods of risk measurement, such as the standard Value-at-Risk supported by BASEL II, are based on subjective assumptions of future returns. Therefore two different models applied to the same portfolio can lead to different values of a risk measure. In order to achieve an objective measurement of risk, we introduce a concept of *Realized Risk* which we define as a directly observable function of realized returns. Predictive assessment of the future risk is given by *Tradeable Measure of Risk* – the price of a financial contract which pays its holder the Realized Risk for a certain period. Our definition of the Realized Risk payoff involves a Weighted Average of Ordered Returns, with the following special cases: the worst return, the empirical Value-at-Risk, and the empirical mean shortfall. When Tradeable Measures of Risk of this type are priced and quoted by the market (even of an experimental type), one does not need a model to calculate values of a risk measure since it will be observed directly from the market. We use an option pricing approach to obtain dynamic pricing formulas for these contracts, where we make an assumption about the distribution of the returns. We also discuss the connection between Tradeable Measures of Risk and the axiomatic definition of Coherent Measures of Risk. (joint work with Libor Pospíšil and Mingxin Xu)

14:30 - 15:20 Pavel Bubák · Warwick Mathematics Institute, UK

Asymptotic Strong Feller Property for Degenerate Diffusions

We study the asymptotic strong Feller property for a class of dissipative semilinear stochastic PDEs, where the intensity of the noise is controlled by an auxiliary Markov process. The noise itself is required to act only on a finite-dimensional subspace of ‘determining modes’ for the system. Furthermore, we focus on the case where the auxiliary process spends some time in ‘bad sets’ which cause the noise to become degenerate or even to vanish. We give a constructive criteria that allows to verify the asymptotic strong Feller property for such systems, provided that the time spent by the auxiliary process in the bad sets is sufficiently short. Our technique of proof relies on the description of an algorithm that allows to construct an appropriate Wiener shift for the application of a Bismut-type formula.

Joint work with Martin Hairer, University of Warwick.

15:30 - 16:20 Tomáš Tichý · Technical University of Ostrava, CZ

Measuring the risk of FX sensitive portfolio

An inherent part of financial modeling is the portfolio modeling procedure. It is important mainly for risk management of financial institutions. Portfolios of financial institutions are sensitive to several market risk factors. As highly important, we can regard exchange rates of foreign currencies. In this paper, we try to model the probability distribution of real returns of FX sensitive portfolio by means of the Variance gamma (VG) model. This popular example of Lévy process family allows us to model also the skewness and kurtosis of underlying distributions. Here, we describe three approaches to the modeling of a multivariate VG process. We compare these models and finally, choose one of them to run a Monte Carlo simulation example. On the basis of random scenarios of the future evolution we calculate the parameters of the portfolio returns distribution, including VaR measure on a daily basis. Although we find several inconsistencies between the empirical distribution and the one modeled by the VG model, we conclude that the application of the multivariate VG model represent a substantial improvement comparing with the Gaussian case.

16:20 - 16:50 *coffee break*

J. Večeř↓

16:50 - 17:40 Libor Pospíšil · Columbia University, New York, USA

Portfolio Sensitivity to the Maximum and the Maximum Drawdown

This talk is based on the article *Portfolio Sensitivity to the Maximum and the Maximum Drawdown*, which is a joint work with Jan Večeř. In the article, we define new *Greeks* for financial derivatives: sensitivities to the running maximum, the running minimum, and the running maximum drawdown of an underlying asset. We calculate these sensitivities for two classes of financial instruments: forwards on the maximum drawdown and lookback options. It turns out that these sensitivities have probabilistic representations. Moreover, these results allow us to interpret the delta-hedge of these contracts in a novel way.

17:50 - 18:40 Petr Novotný · Columbia University, New York, USA

Characterization of Price and Delta Independent Contracts

Characterization of price and delta independent contracts when underlining asset is continuous martingale.

18:50 - 19:40 Martin Šmíd · ÚTIA AS CR (AV ČR), Prague, CZ

Limits (in probability) of microstructure theories

We discuss approximations of three different market microstructure models: the zero intelligence model of limit order market (Smith, Farmer at al. 2003) the inventory problem of a market maker (Garman 1976) and the wealth maximization problem of an investor trading in a limit order market. The partial solution of the third problem (with some questions remaining) is presented and the difficulties with the first two problems are discussed.
