

# Pátek 5.1.2007

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9 : 30 – 12 : 00

Chairman: V. Beneš

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## *Exponential estimates for stochastic convolutions in 2-smooth Banach spaces*

Jan Seidler · ÚTIA ČR, Praha, ČR

The talk will be devoted to sharp estimates of Burkholder-Gundy-Davis type for stochastic integrals in 2-smooth Banach spaces. It will be shown that such estimates yield analogous sharp moment estimates for stochastic convolutions in these spaces and consequently, due to Zygmund's extrapolation theorem, also exponential tail estimates.

## *Lessons Learned from FIFA World Cup 2006 Betting Markets*

Jan Večeř · Columbia University, New York, USA

[ Tomoyuki Ichiba, Mladen Laudanovic ]

Betting markets on FIFA World Cup 2006 related events reached unprecedented efficiency and liquidity. It was possible to buy and sell futures type contracts on the outcome of the game or the number of goals scored, and trade them even during the actual game. Prices of all the traded events (win, draw or loss of a given team; or number of goals) were immediately influenced by a goal or a red card. One can view a goal or a red card as a credit event which affected the prices of the traded contracts, essentially upgrading some of them, and downgrading others. As opposed to markets which trade credit risk, soccer games experience rather high and frequent number of credit events. Thus the betting market on soccer games can serve as an interesting parallel to credit markets, revealing some psychological factors which influence the traders.

We analyze data provided by tradesports.com to estimate the market implied scoring intensity of a given team as the game progressed. This can be viewed as the intensity of upgrading or downgrading the traded betting contracts. We observe that after a goal or a red card, the market experiences several minutes of price turmoil when some of the contracts are mispriced. After the market settles in the post-goal period, the implied intensity of the scoring team typically drops down, while the intensity of the second team is typically unchanged. This could be partially explained by the fact that the scoring team may want to start playing more defensively, but this effect is seen even in situations when the scoring team has an incentive to score even more goals (for instance when still trailing behind the other team). The red card effect is more complex and depends on the individual situation, but it is typically followed by both a decrease in the scoring intensity of the penalized team, and an increase of the intensity of the opponent team.

We also quantitatively define the concept of fairness and excitement of a soccer game. Fairness can be measured by probability that the better team wins (or does not lose the game), while the excitement can be measured by the first variation of the winning probabilities. Dramatic changes in the winning chances make the game more exciting.

## *Ergodicity and parameter estimates for infinite-dimensional fractional Ornstein-Uhlenbeck process*

Jan Pospíšil · Západočeská univerzita, Plzeň, ČR

We study stochastic evolution equation driven by fractional Brownian motion with Hurst parameter  $H < 1/2$  which solution is an infinite-dimensional fractional Ornstein-Uhlenbeck process. We show the existence of the strictly stationary solution and prove the ergodic theorems for a strictly stationary solution as well as for an arbitrary solution. Based on ergodicity, we present several results in parameter estimates in infinite dimensional equations.

***Optimal Decision Making in a Limit Order Market***

**Martin Šmíd** · ÚTIA ČR, Praha, ČR

We formulate a decision problem of an agent maximizing a utility from the terminal wealth by trading in a limit order market; we allow the agent to take only finite number of (possibly costly) actions during the investment period.

We solve the problem in the case of a risk neutral agent and a sub-martingale price process; we find that it is optimal to invest all the initial wealth into the commodity and take no further actions in this case.

We prove that, given the agent is risk averse and there are zero trading costs, our decision problem is equivalent to the traditional continuous-time utility maximization problem.

Finally we show that, even in the case of non-zero trading costs, the usual separation theorems keep holding and, in special cases, the decision for the timing of the actions and the decision for the limit order configurations may be separated.

***On The Structure of General Mean-Variance Hedging Strategies***

**Aleš Černý** · City University London, London, UK

[ Jan Kallsen (TU Muenchen) ]

We provide a new characterisation of mean-variance hedging strategies in a general semimartingale market. The key point is the introduction of a new probability measure  $P^*$  which turns the dynamic asset allocation problem into a myopic one. The minimal martingale measure relative to  $P^*$  coincides with the variance-optimal martingale measure relative to the original probability measure  $P$ .

Preprint is available from <http://ssrn.com/abstract=882762>. To appear in The Annals of Probability.

***$\delta$ -optimal trading strategies for small transaction costs***

**Petr Dostál** · KPMS MFF UK, Praha, ČR

We consider an agent who invests in a stock and a money market and he/she does not consume. His/her aim is to maximize the asymptotics of expected utility of the portfolio market price. We show how to derive an almost optimal strategy for small transaction costs in case that the rate of return and the volatility of the stock market price is not constant and that the rate of return cannot be observed directly. We restrict ourselves to HARA utility function.

***How to properly estimate the level of transaction costs***

**Karel Janeček** · RSJ Invest, a.s., Praha, ČR

Large traders on financial markets usually pay very high transaction costs, as a function of the traded volume. In order to optimize the trading strategy it is important to properly setup the assumed transaction costs. The problem is non-trivial as the unit transaction costs level is a (nonincreasing) function of the accumulated traded volume, while the realized trading volume is a (nonincreasing) function of the assumed transaction costs. We setup a model and show the optimal solution under special assumptions.

***Mean-field limits of linearly interacting diffusions***

**Jan Swart** · ÚTIA ČR, Praha, ČR

In this talk we consider  $N$  identical diffusion processes, interacting through a linear drift, in such a way that each process is attracted to the mean of the other processes. Letting  $N$  to infinity, at the same time rescaling time by a factor  $N$ , it can be shown that under certain assumptions the mean of these  $N$  processes evolves as a diffusion process itself, with a new diffusion function. In certain other cases, it is not so clear how to describe the behavior of the mean for large  $N$ .

# Sobota 6.1.2007

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9 : 00 – 10 : 40

Chairman: J.Večeř

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## *Comparison of Momentum and Contrarian Trading in Different Markets*

**Petr Novotný** · Columbia University, New York, USA

[ Jan Večeř ]

Momentum traders believe in continuation of trends in the market. If the market is increasing, they expect that it will continue to grow and vice versa, when it is falling, it will keep falling. Contrarian traders believe in the mean reversion, they expect that the trends in the market will change. Traditionally, it has been difficult to classify trading strategies as momentum or contrarian. However, we can look at them in the terms of expectation about the Maximum Drawdown (MDD - the largest drop in the market in a given time period), and the Maximum Drawup (MDU - largest increase in the market). Momentum traders essentially believe that MDD or MDU will be larger than expected, while contrarian traders believe that MDD or MDU will be smaller than expected. If we look at the investing strategy which is buying or selling MDD (MDU), we can compare the performance of momentum versus contrarian trading by looking at the difference of the expected (replicable by trading) versus realized MDD (MDU). We have studied several major markets (indices SP500, Dow Jones, NASDAQ, Nikkei; Bonds, EuroDollar). We observe that in stable markets, contrarian strategy tends to overperform momentum trading, while the opposite is true during the times of economic distress.

## *Stochastic Analysis and Credit Risk*

**Libor Pospíšil** · Columbia University, New York, USA

The aim of this talk is to introduce existing structural credit risk models, which are related to stochastic analysis. The models assume that the assets value of a company evolves as a geometric Brownian motion. A drop of the assets value below a certain level means that the company is not able to meet its obligations to creditors.

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11 : 10 – 12 : 50

Chairman: J.Swart

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## *Variability, entropy and randomness in stationary neuronal signals*

**Lubomír Košťál** · Fyziologický ústav AV ČR, Praha, ČR

[ Petr Lánský ]

Neuronal signal can be described as a series of point events in time, called spikes. Statistical characteristics of the inter-spike intervals are often employed to analyse the neuronal activity under steady-state conditions. One of the most important characteristics of the neuronal firing (besides the mean inter-spike interval) is its variability, which is measured by the coefficient of variation. However, the patterns of neuronal activity can be very different even if the variability is fixed. Instead of employing higher statistical moments we propose a measure of randomness based on the information-theoretic quantities like entropy and Kullback-Leibler distance. Randomness and variability describe different aspects of the firing, which can be helpful in inferring on the underlying neurophysiological conditions.

## *Levy driven point processes*

**Viktor Beneš** · KPMS MFF UK, Praha, ČR

For a special type of doubly stochastic point processes we discuss temporal and spatio-temporal case. The problems of filtering, statistics and dependences in multivariate models are investigated. Both analytical and simulation (including Markov chain Monte Carlo) tools are used.