One day mini-workshop on
Calibration, Lévy processes in finance, FFT, and related issues

Supported by the FWF Research Project P18022 "Robust Calibration of Jump-Type Asset Price Models".

Location: Vienna University of Technology, Wiedner Hauptstraße 8-10, 1040 Wien,
Freihaus Building, 7th floor, green section,
Lecture hall "Zeichensaal 3"
Date: Friday, November 16, 2007

Program:

09:00-10:00	**Fiodar Kilin** (Frankfurt School of Finance & Management) **Accelerating the Calibration of Stochastic Volatility Models** *Abstract:* This paper compares the performance of three methods for pricing vanilla options in models with known characteristic function: (1) Direct integration, (2) Fast Fourier Transform (FFT), (3) Fractional FFT. The most important application of this comparison is the choice of the fastest method for the calibration of stochastic volatility models, e.g. Heston, Bates, Barndorff-Nielsen-Shephard models or Levy models with stochastic time. We show that using an additional cache technique makes the calibration with the direct integration method at least seven times faster than the calibration with the fractional FFT method.
10:00-11:00	**Philip Mayer** (Department of Optimisation and Discrete Mathematics, Graz University of Technology) **Robust calibration of local Lévy equity models** *Abstract:* In this talk we present a non-parametric stable calibration method based on Tikhonov regularization for generalized (local) Lévy market models. While the original calibration problem is ill-posed, we are able to prove stability and convergence of the regularized problem and in some cases even obtain convergence rates under the common assumption of an abstract source condition. Finally we underpin the theoretical results by some numerical illustrations.
11:00-11:30	Coffee Break
11:30-12:30	**Denis Belomestny** (Weierstrass Institute for Applied Analysis and Stochastics (WIAS), Berlin) **A jump-diffusion Libor model and its robust calibration** *Abstract:* In this talk I discuss different extensions of Libor Market Model developed in recent years. In particular, a new parsimonious Libor model incorporating jumps and stochastic volatility will be presented. The special emphasis will be made on robust calibration of the extended models. Several parametric and semi-parametric calibration approaches will be considered and their performance compared.
12:30-14:00	Lunch Break

14:00-15:00	**Flavio Angelini** (Dipartimento di Economia, Finanza e Statistica, Università degli Studi di Perugia) **Measuring the error of dynamic hedging: a Laplace transform approach** *Abstract:* We compute the expected value and the variance of the discretization error of delta hedging and of other strategies in the presence of proportional transaction costs. The method, based on Laplace transform, applies to a fairly general class of models, including Black-Scholes, Merton's jump-diffusion and Normal Inverse Gaussian. The results obtained are not asymptotical approximations but exact and efficient formulas, valid for any number of trading dates. They can also be employed under model misspecification to measure the influence of model risk on a hedging strategy.
15:00-16:00	**Peter Tankov** (Laboratoire de Probabilités et Modèles Aléatoires, Université Paris VII) **Asymptotic analysis of hedging errors in models with jumps** *Abstract:* Most authors who studied the problem of hedging an option in incomplete markets and, in particular, in models with jumps focused on finding the strategies that minimize the residual hedging error. However, the resulting strategies are usually unrealistic because they require a continuously rebalanced portfolio, which is impossible in practice due to transaction costs. In reality, the portfolios are rebalanced discretely, which leads to a 'hedging error of the second type', due to the difference between the optimal strategy and its discretely rebalanced version. We analyze this second hedging error and establish a limit theorem for the renormalized error, when the discretization step tends to zero, in the framework of general Itô processes with jumps. This result allows to formulate a number of practical recommendations related to hedging in jump models.
16:00-16:30	Coffee Break
16:30-17:30	**Martin Keller-Ressel** (Research Unit of Financial and Actuarial Mathematics, Vienna University of Technology) **Smile Asymptotics for Affine Stochastic Volatility Models** *Abstract:* We consider the class of affine stochastic volatility models, which includes many known models with and without jumps, such as the Heston model, the Barndorff-Nielsen-Shephard model or the Bates model(s), and which allows for several extensions of these models. In this framework we discuss both known and new results on the shape of the volatility smile as time-to-maturity tends to either 0 or infinity. If time allows we will also present results on the forward smile, which is of importance for the pricing of forward-start options and some exotics such as Cliquet options.
17:30-18:00	**Stefano Herzel** (Dipartimento di Economia, Finanza e Statistica, Università degli Studi di Perugia) **An affine intensity model for large credit portfolios** *Abstract:* We propose a reduced form model for credit risk in a multivariate setting. The default intensities are obtained as a linear combination of three independent factors. The factors are affine jump-diffusion processes that can be interpreted as the intensities of general, sectoral and idiosyncratic credit events. The model is very flexible and can be efficiently calibrated to the term structures of obligors' default probabilities and to their correlations. We formulate an algorithm for the exact simulation of the default times and apply it to the valuation of a cash-flow Collateralized Debt Obligation (CDO). Joint work with Beatrice Acciaio.