



Announcement SoSe 2015 Lecture in Mathematical Finance

Financial models based on Lévy processes

Prof. Dr. Ernst Eberlein

- Area / Modulnr.:** Mathematical Finance / MA
- Course Structure:** Lecture: 2h
- Content:** In the first half of this course an introduction to the theory of Lévy processes will be given. Topics are: explicit construction of Lévy processes based on infinitely divisible distributions, Brownian motion, Poisson process and jump diffusions as standard examples, Lévy-Ito decomposition, analytic as well as path properties, more advanced processes via subordination (generalized hyperbolic, normal inverse Gaussian and variance gamma processes). In the second half of the course dynamic financial models which are driven by Lévy processes will be investigated. Efficient pricing of a broad spectrum of derivative financial products will be discussed. Finally the Lévy interest rate theory (forward rate (HJM), Libor and forward process models) will be developed and pricing formulas for standard interest rate options will be derived.
- Audience:** MSc Mathematical Finance and Actuarial Science
- Prerequisite:** recommended: MA 2409 Probability Theory, MA4405 Stochastic Analysis, MA3702 Continuous Time Finance
- Literature:** Applebaum, D. (2009) Lévy Processes and Stochastic Calculus. Cambridge University Press
Bauer, H. (1996) Probability Theory. de Gruyter
Eberlein, E. (2001) Application of generalized hyperbolic Lévy motions to finance. In Lévy Processes: Theory and Applications, O.E. Barndorff-Nielsen, T. Mikosch and S. Resnick (eds.) pp 319-337, Birkhäuser Verlag
Eberlein, E. (2009) Jump-type Lévy processes. In Handbook of Financial Time Series, T.G. Andersen, R.A. Davis, J.-P. Kreiß, T. Mikosch (eds.) pp 439-455, Springer-Verlag
Eberlein, E. (2013) Fourier based valuation methods in mathematical finance. In Quantitative Energy Finance, F. Benth, V. Kholodnyi, and P. Laurence (eds.) pp. 85–114, Springer Verlag
Sato, Ken-Iti (1999) Lévy Processes and Infinitely Divisible Distributions. Cambridge University Press
Schoutens, Wim (2003) Lévy Processes in Finance. Wiley
- Certificate:** Oral or written Exam, 3 CP
- Location and Time:** Tue 21.4. Wed 22.4. Kolloquium: Wed 10.6.
Tue 28.4. Wed 29.4. Exam: Tue 23.6.
Tue 5.5. Wed 6.5.
Tue 12.5. Wed 13.5.
Tue 2.6. Wed 3.6.
Tue 9.6.
Tue 16.6.