Math 3227, Fall 2012
Math of Finance 3: Jump Processes and Applications

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Lectures: Wednesday 6:00-8:30 pm in 704 Thackeray Hall.

Office Hours: or by appointment in 404 Thackeray Hall.

Description:

This course is about using Lévy processes and other stochastic processes with jumps to model the financial market fluctuations and other similar physical phenomena. we are trying to keep the notations/statements as concise as possible in order to put more attention on motivations: Which features of Lévy processes are tractable in modeling and facilitate simulations? As applications, we will provide a lot of simulation algorithms as well as their numerical/empirical illustrations in various fields such as option pricing, risk management, calibration and etc. Surprisely, this courses demonstrates that the concepts and tools necessary for understanding and implementing models with jumps can be more intuitive than those involved in the Black-Scholes and diffusion models.

Text: "*Financial Modelling with Jump Processes*" by Rama Cont and Peter Tankov (Chapman & Hall, ISBN: 1-584-88413-4).

Supplementary Text:

• "*Lèvy Processes in finance*" by Wim Schoutens (Wiley & Sons, ISBN: 0-470-85156-2)

• "*Lèvy Processes and Stochastic Calculus*" by David Applebaum (Cambridge University Press, ISBN: 0-521-83263-2)

• "*Lèvy Processes*" by Jean Bertoin (Cambridge University Press, ISBN: 0-521-56243-0)

• "*Lèvy Processes and Infinitely Divisible Distributions*" by Ken-ITI SATO (Cambridge University Press, ISBN: 0-521-55302-4)

• "*Stochastic Integration and Differential Equations* ($2^n ded.$)" by Philip Protter (Springer-Verlag, ISBN: 3-540-00313-4)

To review the basic knowledge of stochastic analysis and mathematical finance, please use e.g.

• "*Stochastic calculus for finance Vol. 1 & 2*" by Steven Shreve (Springer-Verlag, ISBN: 0-387-40100-8)

• "*Probability with Martingales* ($2^n ded.$)" by David Williams (Cambridge University Press, ISBN: 0-521-40605-6)

Grading:

No exam but probabily two simulation assignments.