

16:958:535:01 Advanced Statistical Methods in Finance

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Prerequisites: FSRM 16:958:563 Regression Analysis in Finance

Course Description: Conditional expectation and martingales, return and yield curve, portfolio theory, derivatives, risk neutral measure and complete market in discrete models, forward-futures spread, Brownian motion and stochastic calculus, Girsanov's theorem, the Black-Scholes-Merton model, Greeks, implied volatility, financial risks, value at risk, back test and stress test, estimation of volatilities and correlations, principle component analysis and factor models, credit risk, estimation of default rate, copulas, interest rate derivatives, short rate models, more if time permit.

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Office hours: Monday 4:00-5:00 pm and Thursday 4:00-5:00 pm, 553 Hill Center; Monday 5:00-6:00 pm, 569 Hill Center (email: czhang@stat.rutgers.edu)

Website: <https://sakai.rutgers.edu>

Text 1: John C. Hull (2012). *Options, Futures, and Other Derivatives*, 8th. Ed. Prentice Hall, Boston. ISBN-10, 0132777428. ISBN-13, 978-0132777421.

Text 2: David Ruppert (2010). *Statistics and Data Analysis for Financial Engineering*. Springer, New York. ISBN-10, 1441977864. ISBN-13, 978-1441977861.

Homework: All homework assignments are due in one week unless otherwise announced. Late homework will not be accepted. DO NOT COPY from each other or from other sources.

Final grade: Homework, 30%; Midterm Exam, 30% (March 7); Final Exam, 40% (May 9)