Contact Details
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Course Details
Lecture: Monday 9:50 AM - 11:10 AM, NJ-105
           Thursday 9:50 AM - 11:10 AM, NJ-105

Required Textbook

Other Useful Textbooks

Topics to be Covered
Part I. Discrete Time Modeling of Risk: GARCH Models

- GARCH(p,q) process
  - Strict stationarity and second-order stationarity
  - Moments and autocovariances
- Identification and Estimation
  - Identifying the GARCH orders
– Lagrange multiplier test for conditional homoscedasticity
– Estimating ARCH models by least squares
– Estimating GARCH models by quasi-maximum likelihood

• Statistical inference
  – Test of the second-order stationarity assumption
  – Significance of the GARCH coefficients

• Extensions
  – Generalized autoregressive score (GAS) model
  – Multivariate GARCH processes

Part II. Continuous Time Modeling of Risk: Stochastic Volatility and Jumps

• Introduction to stochastic process
  – Stochastic integral and stochastic differential equation
  – Brownian motion
  – Poisson process

• Volatility
  – Integrated volatility
  – Spot volatility
  – Volatility occupation time

• Jumps
  – Identification of jumps
  – Jump activity and jump tail behavior
  – Self- and mutual excitation of jumps

• Financial applications
  – Risk premia
  – Macro news and price jumps