

E4702 Statistical Inference for Financial Engineering

1.5 Credit

Rational: To be taught in August every time as a core course for FE master students.

Instructor: Steven Kou

Bulletin Description:

The course covers basic tools of statistical inference relevant to financial engineering. The statistical topics covered include point estimation, maximum likelihood estimators, confidence intervals, the delta method, hypothesis testing, and goodness of fit tests. The financial examples include selection bias in finance, estimation of drift and volatility in the geometric Brownian motion model, the leptokurtic feature, and difficulties in estimating the tail distributions of asset returns.

Prerequisites: Probability at the level of IEOR E4150.

Textbook:

None. Lecture notes will be available

Grading:

HWK: 15%, Project 15%, Midterm 30%, Final 40%

Schedule

1. Introduction, Review of Basic Probability
2. Random Sample and Selection Bias in Finance, the Concept of Estimation and Confidence Interval
3. Maximum Likelihood Estimation, Estimation for Geometric Brownian Motion Model, the Delta Method

4. Hypothesis Testing and its Application for Geometric Brownian Motion Model
5. Goodness of Fit Tests, Chi-Square, Kolmogorov-Smirnov Test, Testing of the Geometric Brownian Motion Model
6. The Leptokurtic Feature and Difficulties in Estimating the Tail Distributions of asset returns.