

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks

FE5222 Advanced Derivative Pricing

Wu Lei

Risk Management Institute, National University of Singapore

rmiwul@nus.edu.sg

August 14, 2019

Overview

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks

1 Syllabus

2 Course Logistics

- Assessment
- Office Hour
- Textbooks

Syllabus

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks

■ Mathematical Foundation

- 1 Probability
- 2 Stochastic Process (Brownian motion)
- 3 Stochastic Calculus

Syllabus

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment
Office Hour
Textbooks

- Mathematical Foundation
 - 1 Probability
 - 2 Stochastic Process (Brownian motion)
 - 3 Stochastic Calculus
- Risk Neutral Pricing Approach
 - 1 Risk Neutral Pricing Approach
 - 2 Fundamental Theorems of Asset Pricing
 - 3 Stochastic Differentiation Equations

Syllabus

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment
Office Hour
Textbooks

- Mathematical Foundation
 - 1 Probability
 - 2 Stochastic Process (Brownian motion)
 - 3 Stochastic Calculus
- Risk Neutral Pricing Approach
 - 1 Risk Neutral Pricing Approach
 - 2 Fundamental Theorems of Asset Pricing
 - 3 Stochastic Differentiation Equations
- Option Pricing and Hedging
 - Pricing of Exotic Options
 - Change of Numeraire
 - Replication Principles
 - Hedging Analysis

Syllabus

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment
Office Hour
Textbooks

- Mathematical Foundation
 - 1 Probability
 - 2 Stochastic Process (Brownian motion)
 - 3 Stochastic Calculus
- Risk Neutral Pricing Approach
 - 1 Risk Neutral Pricing Approach
 - 2 Fundamental Theorems of Asset Pricing
 - 3 Stochastic Differentiation Equations
- Option Pricing and Hedging
 - Pricing of Exotic Options
 - Change of Numeraire
 - Replication Principles
 - Hedging Analysis
- Smile Modeling
 - 1 Volatility Smile
 - 2 Local Volatility Model
 - 3 Stochastic Volatility Model

Assessment

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks

Assessment for this course is based on homework (30%), group project (30%) and final exam (40%).

- Homework (30%),
Six homework sets, each consisting of 8 to 10 problems.

Assessment

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks

Assessment for this course is based on homework (30%), group project (30%) and final exam (40%).

- Homework (30%),
Six homework sets, each consisting of 8 to 10 problems.
- Group Project (30%)
Topics for project include:
 - 1 Pricing an exotic option
 - 2 Build a smile model (local volatility or stochastic volatility model)
 - 3 Analyze hedge performance

Each group will have maximum 3 students. You are required to write code for implementation and a detailed report for the project.

Assessment

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment
Office Hour
Textbooks

Assessment for this course is based on homework (30%), group project (30%) and final exam (40%).

- Homework (30%),
Six homework sets, each consisting of 8 to 10 problems.
- Group Project (30%)
Topics for project include:
 - 1 Pricing an exotic option
 - 2 Build a smile model (local volatility or stochastic volatility model)
 - 3 Analyze hedge performance

Each group will have maximum 3 students. You are required to write code for implementation and a detailed report for the project.

- Final Exam (40%, 6 Dec 2019, 7pm-9.30pm)
Open book exam. Questions are at similar level of difficulty as homework.

Office Hour

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks

- No official office hour for this course
- In class or weekend (appointment by email)

Textbooks

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks

- No required textbook
- Lecture notes will be uploaded to course website after class
- Reference books are available at RMI

References

Overview

Wu Lei

Syllabus

Course
Logistics

Assessment

Office Hour

Textbooks



[Shreve, Steven](#)

Stochastic Calculus for Finance II, Continuous-Time Models



[Emanuel Derman, Michael B. Miller, David Park](#)

The Volatility Smile (Wiley Finance), 1st Edition



[Jim Gatheral](#)

The Volatility Surface: A Practitioner's Guide