Introduction to Mathematic Finance

Session: 2024-2025 Sprint term

Lecturer: Dr. Lianghai Xiao

This module introduces the fundamentals of mathematical modelling in finance, and the mathematics of financial annuities and investments. We explore the use of deterministic models that can be used to model and value known cashflows. We also explore stochastic, discrete-time models of investment risk and return.

This course consists of 36 hours of lectures, which contain 5 hours of example classes.

3 hour-Examination (covering both theory with proofs and problem solving): 80%  
Continuous assessment (homework): 20%

Syllabus

Theory of Interest Rates: explores the fundamental concepts and principles underlying interest rates.

Equations of Value: this involves mathematical representations of financial concepts, such as present value, future value, annuities, and perpetuities.

Introduction to Interest Rate Models: it includes mathematical models those are used to represent and understand the movements of interest rates over time.

Data and financial modelling: it explains how to use mathematical models to model financial assets in real world.

Measures of Investment Risk: This section deals with different metrics and methods used to quantify and assess the risk associated with investments.

Modern Portfolio Theory: The Modern Portfolio Theory (MPT) was developed by Harry Markowitz and focuses on the optimal allocation of assets in a portfolio.

Asset Valuation: Asset valuation involves determining the intrinsic value of financial instruments such as stocks, bonds, and other securities.

Module Outcomes:

1.       Describe, interpret, and discuss the theories on interest rates.

2.       Derive and define constant and time-varying compound interest functions and annuities

3.       Define, interpret, and apply an Equation of Value

4.       Describe, construct, interpret, and discuss the models underlying asset valuations

5.       Discuss the advantages and disadvantages of different measures of investment risk

For any questions, students are encouraged to contact the lecturer by email:

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