NPTEL Video Course - Mathematics - NOC:Mathematical Portfolio Theory

Subject Co-ordinator - Prof. Siddhartha Pratim Chakrabarty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Probability space and their properties, Random variables
Lecture 2 - Mean, variance, covariance and their properties
Lecture 3 - Linear regression; Binomial and normal distribution; Central Limit Theorem
Lecture 4 - Financial markets
Lecture 5 - Bonds and stocks
Lecture 6 - Binomial and geometric Brownian motion (gBm) asset pricing models
Lecture 7 - Expected return, risk and covariance of returns
Lecture 8 - Expected return and risk of a portfolio; Minimum variance portfolio
Lecture 9 - Multi-asset portfolio and Efficient frontier
Lecture 10 - Capital Market Line and Derivation of efficient frontier
Lecture 11 - Capital Asset Pricing Model and Single index model
Lecture 12 - Portfolio performance analysis
Lecture 13 - Utility functions and expected utility
Lecture 14 - Risk preferences of investors
Lecture 15 - Absolute Risk Aversion and Relative Risk Aversion
Lecture 16 - Portfolio theory with utility functions
Lecture 17 - Geometric Mean Return and Roy's Safety-First Criterion
Lecture 18 - Kataoka's Safety-First Criterion and Telser's Safety-First Criterion
Lecture 19 - Semi-variance framework
Lecture 20 - Stochastic dominance; First order stochastic dominance
Lecture 21 - Second order stochastic dominance and Third order stochastic dominance
Lecture 22 - Discrete time model and utility function
Lecture 23 - Optimal portfolio for single-period discrete time model
Lecture 24 - Optimal portfolio for multi-period discrete time model; Discrete Dynamic Programming
Lecture 25 - Continuous time model; Hamilton-Jacobi-Bellman PDE
Lecture 26 - Hamilton-Jacobi-Bellman PDE; Duality/Martingale Approach
Lecture 27 - Duality/Martingale Approach in Discrete and Continuous Time
Lecture 28 - Interest rates and bonds; Duration
Lecture 29 - Duration; Immunization