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Markowitz Portfolio OptimizationLecture 1: Portfolio Choice with Multiple Assets Single Index Model Explained and in Excel | Single Index Model Regression Example ~~KELLY CRITERION | Ed Thorp | Optimal Position Sizing For Stock Trading~~ Modern Portfolio Theory - Explained in 4 Minutes Walkthrough of 60-Stock Article: Portfolio Optimization Using Classical and Quantum Algorithms Python For Finance Portfolio Optimization ~~Top 10 Books on Options Trading~~ Minimum Variance Portfolio in Excel: Multi-asset case AF02c Replicated Portfolio Option Valuation CAPM - What is the Capital Asset Pricing Model Kelly Criterion Trading Strategy : Used by Buffett, Munger, Pabrai A Deep Look Into Charlie Mungers Portfolio 16. Portfolio Management ~~TOP 5 INCREDIBLE BOOKS ON INVESTING | DAY TRADING, SWING TRADING, OPTIONS and More | Zulayla~~ Modern Portfolio Theory Explained! Kelly Criterion - Optimal Investment and Bet Sizing - Kelly Formula - Kelly Bet ~~Kelly Criterion Explained~~ ~~Portfolio Optimization Seven Security Example with Excel Solver~~ ~~FI 4080W Optimal Portfolio 8 Stocks~~ Option Trading - The Kelly Criterion Formula: Mazimize your Growth Rate \u0026 Account Utility... Optimal portfolios with Excel Solver ~~Analyzing Investment Strategies with CVaR Portfolio Optimization in MATLAB~~ Q4: Portfolio Optimization – Risk Preferences In, Trades Out · Scott Sanderson The Ultimate Masterclass for Macro Investing (w/ Raoul Pal \u0026 Diego Parrilla) ~~Portfolio Optimization~~ ~~Efficient Frontier in Excel: Two Asset Case~~ Portfolio Optimization using Excel Solver Which Options Strategy Has The Highest Return? [Episode 141] Ray Dalio's All Weather Portfolio: How To Properly Diversify Your Investments And Lower Risk Option Pricing And Portfolio Optimization
The subject of financial mathematics includes option pricing and portfolio optimization, stochastic integration, rigorous methods due to Ito and Feynman-Kac, Monte-Carlo simulation, among others. The prerequisite include a little measure theory, differential equations, and functional analysis.

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Options Pricing and Portfolio Optimization: Modern Methods ...
to risk management, from option pricing to model calibration can be solved e ciently using modern optimization techniques. This course discusses sev-eral classes of optimization problems (including linear, quadratic, integer, dynamic, stochastic, conic, and robust programming) encountered in nan-cial models.

Optimization Methods in Finance
Portfolio optimization and American option pricing problems are among the most important problems in financial engineering. Portfolio optimization problems occur throughout the financial services as pension funds, mutual funds, insurance companies, endowments and other financial entities all face

Duality Theory and Approximate Dynamic Programming for ...
Nikitas Stamatopoulos, Daniel J. Egger, Yue Sun, Christa Zoufal, Raban Iten, Ning Shen, and Stefan Woerner, Quantum 4, 291 (2020). We present a methodology to price options and portfolios of options on a gate-based quantum computer using amplitude estimation, an algorithm which provides a quadratic speedup compared to c…

Option Pricing using Quantum Computers – Quantum
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Option Pricing and Portfolio Optimization: Modern Methods ...
Haugh (2007) used duality and approximate dynamic programming (ADP) methods to facilitate high-dimensional American option pricing and portfolio optimization. Zymler (2011) used robust portfolio optimization aimed to maximize the worst-case portfolio return for designing portfolios that include European-style options. This model trades off weak and strong guarantees on the worst-case portfolio return.

Option Portfolio Selection with Generalized Entropic ...
To understand how to maximize the profit or revenue per customer when they face so many options, you need to adapt your research approach to a more holistic pricing and portfolio optimization. Traditional pricing research (e.g. Kano, SKIM Price Explorer, choice-based conjoint, etc.) typically focuses on determining the content and / or price sensitivity of the base offer or the willingness to pay for the value-added services, as two separate exercises. However, if you rely on such an ...

Webinar "Pricing beyond the standard: Portfolio ...
A standard (vanilla) option contract consists of the fol- lowing parameters: option price, the underlying asset (mostly stocks), expiration date, and strike price. A call (put) option gives the option holder the right, rather than obligation, to buy (sell) the underlying asset by the expiration date for the strike price.

A Markowitz Portfolio Approach to Options Trading
Option pricing function for the Heston model based on the implementation by Christian Kahl, Peter Jäckel and Roger Lord. Includes Black-Scholes-Merton option pricing and implied volatility estimation. No Financial Toolbox required.

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Ralf Korn is the author of Option Pricing And Portfolio Optimization (4.50 avg rating, 2 ratings, 0 reviews, published 2001), Monte Carlo Methods and Mod...

Ralf Korn (Author of Option Pricing And Portfolio ...
By the end of this course, students will be able to - Use reinforcement learning to solve classical problems of Finance such as portfolio optimization, optimal trading, and option pricing and risk management. - Practice on valuable examples such as famous Q-learning using financial problems.

Understanding and working with the current models of financial markets requires a sound knowledge of the mathematical tools and ideas from which they are built. Banks and financial houses all over the world recognize this and are avidly recruiting mathematicians, physicists, and other scientists with these skills. The mathematics involved in modern finance springs from the heart of probability and analysis: the Ito calculus, stochastic control, differential equations, martingales, and so on. The authors give rigorous treatments of these topics, while always keeping the applications in mind. Thus, the way in which the mathematics is developed is governed by the way it will be used, rather than by the goal of optimal generality. Indeed, most of the purely mathematical topics are treated in extended ``excursions'' from the applications into the theory. Thus, with the main topic of financial modelling and optimization in view, the reader also obtains a self-contained and complete introduction to the underlying mathematics. This book is specifically designed as a graduate textbook. It could be used for the second part of a course in probability theory, as it includes an applied introduction to the basics of stochastic processes (martingales and Brownian motion) and stochastic calculus. It would also be suitable for a course in continuous-time finance that assumes familiarity with stochastic processes. The prerequisites are basic probability theory and calculus. Some background in stochastic processes would be useful, but not essential. Especially useful for students seeking a lively introduction to Ito calculus. --Short Book Reviews, International Statistical Institute

This thesis consists of three papers which cover the efficient Monte Carlo simulation in option pricing, the application of realized volatility in trading strategies and geometrical analysis of a four asset mean variance portfolio optimization problem. The first paper studies different efficient simulation methods to price options with different characters such as moneyness and maturity times. The incomplete market environments are also been considered. The second paper uses realized volatility based on high frequency data to improve the volatility trading strategy. The performance is compared with that using the implied volatility. The last paper re-examines the Markowitz's portfolio optimization problem using a general case. It also extends the problem to four assets, it describes the exact mean variance efficient fronter in the weight space and studies the frontier in the mean variance space. The thesis may serve to help our understanding of how to apply numerical and analytical methods to solve financial problems.

Understanding and working with the current models of financial markets requires a sound knowledge of the mathematical tools and ideas from which they are built. Banks and financial houses all over the world recognize this and are avidly recruiting mathematicians, physicists, and other scientists with these skills. The mathematics involved in modern finance springs from the heart of probability and analysis, for example: the It calculus, stochastic control, differential equations, and martingales. The authors give rigorous treatments of these topics, while always keeping the applications in mind. Thus, the way in which the mathematics is developed is governed by the way it will be used, rather than by the goal of optimal generality. Indeed, most of purely mathematical topics are treated in extended excursions from the applications into the theory. Thus, with the main topic of financial modelling and optimization in view, the reader also obtains a self-contained and complete introduction to the underlying mathematics. This book is specifically designed as a graduate textbook.

Computationally-intensive tools play an increasingly important role in financial decisions. Many financial problems-ranging from asset allocation to risk management and from option pricing to model calibration-can be efficiently handled using modern computational techniques. Numerical Methods and Optimization in Finance presents such computational techniques, with an emphasis on simulation and optimization, particularly so-called heuristics. This book treats quantitative analysis as an essentially computational discipline in which applications are put into software form and tested empirically. This revised edition includes two new chapters, a self-contained tutorial on implementing and using heuristics, and an explanation of software used for testing portfolio-selection models. Postgraduate students, researchers in programs on quantitative and computational finance, and practitioners in banks and other financial companies can benefit from this second edition of Numerical Methods and Optimization in Finance. Introduces numerical methods to readers with economics backgrounds Emphasizes core simulation and optimization problems Includes MATLAB and R code for all applications, with sample code in the text and freely available for download

Presents inference and simulation of stochastic process in the field of model calibration for financial times series modelled by continuous time processes and numerical option pricing. Introduces the bases of probability theory and goes on to explain how to model financial times series with continuous models, how to calibrate them from discrete data and further covers option pricing with one or more underlying assets based on these models. Analysis and implementation of models goes beyond the standard Black and Scholes framework and includes Markov switching models, Lévy models and other models with jumps (e.g. the telegraph process); Topics other than option pricing include: volatility and covariation estimation, change point analysis, asymptotic expansion and classification of financial time series from a statistical viewpoint. The book features problems with solutions and examples. All the examples and R code are available as an additional R package, therefore all the examples can be reproduced.

This dissertation, "Asset Pricing, Hedging and Portfolio Optimization" by Jun, Fu, , was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. Abstract: Starting from the most famous Black-Scholes model for the underlying asset price, there has been a large variety of extensions made in recent decades. One main strand is about the models which allow a jump component in the asset price. The first topic of this thesis is about the study of jump risk premium by an equilibrium approach. Different from others, this work provides a more general result by modeling the underlying asset price as the ordinary exponential of a L'vy process. For any given asset price process, the equity premium, pricing kernel and an equilibrium option pricing formula can be derived. Moreover, some empirical evidence such as the negative variance risk premium, implied volatility smirk, and negative skewness risk premium can be well explained by using the relation between the physical and risk-neutral distributions for the jump component. Another strand of the extensions of the Black-Scholes model is about the models which can incorporate stochastic volatility in the asset price. The second topic of this thesis is about the replication of exponential variance, where the key risks are the ones induced by the stochastic volatility and moreover it can be correlated with the returns of the asset, referred to as leverage effect. A time-changed L'vy process is used to incorporate jumps, stochastic volatility and leverage effect all together. The exponential variance can be robustly replicated by European portfolios, without any specification of a model for the stochastic volatility. Beyond the above asset pricing and hedging, portfolio optimization is also discussed. Based on the Merton (1969, 1971)'s reduced portfolio optimization and the delta hedging problem, a portfolio of an option, the underlying stock and a risk-free bond can be optimized in discrete time and its optimal solution can be shown to be a mixture of the Merton's result and the delta hedging strategy. The main approach is the elasticity approach, which has initially been proposed in continuous time. In addition to the above optimization problem in discrete time, the same topic but in a continuous-time regime-switching market is also presented. The use of regime-switching makes our market incomplete, and makes it difficult to use some approaches which are applicable in complete market. To overcome this challenge, two methods are provided. The first method is that we simply do not price the regime-switching risk when obtaining the risk-neutral probability. Then by the idea of elasticity, the utility maximization problem can be formulated as a stochastic control problem with only a single control variable, and explicit solutions can be obtained. The second method is to introduce a functional operator to general value functions of stochastic control problem in such a way that the optimal value function in our setting can be given by the limit of a sequence of value functions defined by iterating the operator. Hence the original problem can be deduced to an auxiliary optimization problem, which can be solved as if we were in a single-regime market, which is complete. DOI: 10.5353/th_b4819934 Subjects: Capital assets pricing model He

Portfolio optimization problems with transaction costs have been widely studied by both financial economists and financial engineers through various approaches. In this paper, we propose the following approach. In analogy to American option pricing, we study the problem through the Finite Element Method (FEM) combined with an optimization method: We set up a buy-and-hold problem and then we find an optimal set of trades to move to an optimal portfolio whenever the current portfolio is far from the ideal. Local Discontinuous Galerkin (LDG) FEM is used to solve the partial differential equation (PDE) associated with the buy-and-hold problem. Coupled with the Runge-Kutta method for time discretization, this method is local with respect to spatial variable, can be used to achieve any order of accuracy and is explicit in the semi-discrete Ordinary Differential Equation (ODE) form. Also it is amendable to parallel computing. In this paper we give error bounds for the LDG method, with which we establish overall bounds for the portfolio optimization problem and prove the convergence of this method.

In answer to the intense development of new financial products and the increasing complexity of portfolio management theory, Portfolio Optimization and Performance Analysis offers a solid grounding in modern portfolio theory. The book presents both standard and novel results on the axiomatics of the individual choice in an uncertain framework, contains a precise overview of standard portfolio optimization, provides a review of the main results for static and dynamic cases, and shows how theoretical results can be applied to practical and operational portfolio optimization. Divided into four sections that mirror the book's aims, this resource first describes the fundamental results of decision theory, including utility maximization and risk measure minimization. Covering both active and passive portfolio management, the second part discusses standard portfolio optimization and performance measures. The book subsequently introduces dynamic portfolio optimization based on stochastic control and martingale theory. It also outlines portfolio optimization with market frictions, such as incompleteness, transaction costs, labor income, and random time horizon. The final section applies theoretical results to practical portfolio optimization, including structured portfolio management. It details portfolio insurance methods as well as performance measures for alternative investments, such as hedge funds. Taking into account the different features of portfolio management theory, this book promotes a thorough understanding for students and professionals in the field.

A comprehensive overview of weak convergence of stochastic processes and its application to the study of financial markets. Split into three parts, the first recalls the mathematics of stochastic processes and stochastic calculus with special emphasis on contiguity properties and weak convergence of stochastic integrals. The second part is devoted to the analysis of financial theory from the convergence point of view. The main problems, which include portfolio optimization, option pricing and hedging are examined, especially when considering discrete-time approximations of continuous-time dynamics. The third part deals with lattice- and tree-based computational procedures for option pricing both on stocks and stochastic bonds. More general discrete approximations are also introduced and detailed. Includes detailed examples.

This thesis summarizes most of my recent research in the field of portfolio optimization. The main topics which I have addressed are portfolio problems with stochastic interest rates and portfolio problems with defaultable assets. The starting point for my research was the paper "A stochastic control ap proach to portfolio problems with stochastic interest rates" (jointly with Ralf Korn), in which we solved portfolio problems given a Vasicek term structure of the short rate. Having considered the Vasicek model, it was obvious that I should analyze portfolio problems where the interest rate dynamics are gov erned by other common short rate models. The relevant results are presented in Chapter 2. The second main issue concerns portfolio problems with default able assets modeled in a firm value framework. Since the assets of a firm then correspond to contingent claims on firm value, I searched for a way to easily deal with such claims in portfolio problems. For this reason, I developed the elasticity approach to portfolio optimization which is presented in Chapter 3. However, this way of tackling portfolio problems is not restricted to portfolio problems with default able assets only, but it provides a general framework allowing for a compact formulation of portfolio problems even if interest rates are stochastic.