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Applied Stochastic Differential Equations Springer Science & Business Media
A comprehensive introduction to the core issues of stochastic differential equations and their effective application Introduction to Stochastic Differential Equations with Applications to Modelling in Biology and Finance offers a comprehensive examination to the most important issues of stochastic differential equations and their applications. The author — a noted expert in the field — includes myriad illustrative examples in modelling dynamical phenomena subject to randomness, mainly in biology, bioeconomics and finance, that clearly demonstrate the usefulness of stochastic differential equations in these and many other areas of science and technology. The text also features real-life situations with experimental data, thus covering topics such as Monte Carlo simulation and statistical issues of estimation, model choice and prediction. The book includes the basic theory of option pricing and its effective application using real-life. The important issue of which stochastic calculus, It ô or Stratonovich, should be used in applications is dealt with and the associated controversy resolved. Written to be accessible for both mathematically advanced readers and those with a basic understanding, the text offers a wealth of exercises and examples of application. This important volume: Contains a complete introduction to the basic issues of stochastic differential equations and their effective application Includes many examples in modelling, mainly from the biology and finance fields Shows how to: Translate the physical dynamical phenomenon to mathematical models and back, apply with real data, use the models to study different scenarios and understand the effect of human interventions Conveys the intuition behind the theoretical concepts Presents exercises that are designed to enhance understanding Offers a supporting website that features solutions to exercises and R code for algorithm implementation Written for use by graduate students, from the areas of application or from mathematics and statistics, as well as academics and professionals wishing to study or to apply these models, Introduction to Stochastic Differential Equations with Applications to Modelling in Biology and Finance is the authoritative guide to understanding the issues of stochastic differential equations and their application.

Mathematical Control Theory and Finance Springer Science & Business Media
Stochastic optimization problems arise in decision-making problems under uncertainty, and find various applications in economics and finance. On the other hand, problems in finance have recently led to new developments in the theory of stochastic control. This volume provides a systematic treatment of stochastic optimization problems applied to finance by presenting the different existing methods: dynamic programming, viscosity solutions, backward stochastic differential equations, and martingale duality methods. The theory is discussed in the context of recent developments in this field, with complete and detailed proofs, and is illustrated by means of concrete examples from the world of finance: portfolio allocation, option hedging, real options, optimal investment, etc. This book is directed towards graduate students and researchers in mathematical finance, and will also benefit applied mathematicians interested in financial applications and practitioners wishing to know more about the use of stochastic optimization methods in finance.

The Effect of Capital Controls on Foreign Direct Investment Decisions Under Country Risk with Intangible Assets John Wiley & Sons
An introduction to the mathematical theory and financialmodels developed and used on Wall Street Providing both a theoretical and practical approach to theunderlying mathematical theory behind financial models, Measure,Probability, and Mathematical Finance: A Problem-OrientedApproach presents important concepts and results in measuretheory, probability theory, stochastic processes, and stochasticcalculus. Measure theory is indispensable to the rigorousdevelopment of probability theory and is also necessary to properlyaddress martingale measures, the change of numeraire theory, andLIBOR market models. In addition, probability theory is presentedto facilitate the development of stochastic processes, includingmartingales and Brownian motions, while stochastic processes andstochastic calculus are discussed to model asset prices and developderivative pricing models. The authors promote a problem-solving approach when applyingmathematics in real-world situations, and readers are encouraged toaddress theorems and problems with mathematical rigor. In addition,Measure, Probability, and Mathematical Finance features: A comprehensive list of concepts and theorems from measuretheory, probability theory, stochastic processes, and stochasticcalculus Over 500 problems with hints and select solutions to reinforcebasic concepts and important theorems Classic derivative pricing models in mathematical finance thathave been developed and published since the seminal work of Blackand Scholes Measure, Probability, and Mathematical Finance: AProblem-Oriented Approach is an ideal textbook for introductoryquantitative courses in business, economics, and mathematicalfinance at the upper-undergraduate and graduate levels. The book isalso a useful reference for readers who need to build theirmathematical skills in order to better understand the mathematicaltheory of derivative pricing models.

Surveys in Stochastic Processes Stochastic Differential Equations
This book is devoted to unstable solutions of stochastic differential equations (SDEs). Despite the huge interest in the theory of SDEs, this book is the first to present a systematic study of the instability and asymptotic behavior of the corresponding unstable stochastic systems. The limit theorems contained in the book are not merely of purely mathematical value; rather, they also have practical value. Instability or violations of stability are noted in many phenomena, and the authors attempt to apply mathematical and stochastic methods to deal with them. The main goals include exploration of Brownian motion in environments with anomalies and study of the motion of the Brownian particle in layered media. A fairly wide class of continuous Markov processes is obtained in the limit. It includes Markov processes with discontinuous transition densities, processes that are not solutions of

any Itô's SDEs, and the Bessel diffusion process. The book is self-contained, with presentation of definitions and auxiliary results in an Appendix. It will be of value for specialists in stochastic analysis and SDEs, as well as for researchers in other fields who deal with unstable systems and practitioners who apply stochastic models to describe phenomena of instability.

Continuous-time Stochastic Control and Optimization with Financial Applications Springer Science & Business Media
Brownian Motion Calculus presents the basics of Stochastic Calculus with a focus on the valuation of financial derivatives. It is intended as an accessible introduction to the technical literature. A clear distinction has been made between the mathematics that is convenient for a first introduction, and the more rigorous underpinnings which are best studied from the selected technical references. The inclusion of fully worked out exercises makes the book attractive for self study. Standard probability theory and ordinary calculus are the prerequisites. Summary slides for revision and teaching can be found on the book website.

Stochastic Differential Equations Springer Nature
The Abel Symposium 2005 was organized as a tribute to the work of Kiyosi Ito on the occasion of his 90th birthday. Distinguished researchers from all over presented the newest developments within the exciting and fast growing field of stochastic analysis. This volume combines both papers from the invited speakers and contributions by the presenting lecturers. In addition, it includes the Memoirs that Kiyoshi Ito wrote for this occasion.

Stochastic Partial Differential Equations Springer Science & Business Media
This book presents innovations in the mathematical foundations of financial analysis and numerical methods for finance and applications to the modeling of risk. The topics selected include measures of risk, credit contagion, insider trading, information in finance, stochastic control and its applications to portfolio choices and liquidation, models of liquidity, pricing, and hedging. The models presented are based on the use of Brownian motion, Lévy processes and jump diffusions. Moreover, fractional Brownian motion and ambit processes are also introduced at various levels. The chosen blend of topics gives an overview of the frontiers of mathematics for finance. New results, new methods and new models are all introduced in different forms according to the subject. Additionally, the existing literature on the topic is reviewed. The diversity of the topics makes the book suitable for graduate students, researchers and practitioners in the areas of financial modeling and quantitative finance. The chapters will also be of interest to experts in the financial market interested in new methods and products. This volume presents the results of the European ESF research networking program Advanced Mathematical Methods for Finance.

Parametric Lie Group Actions on Global Generalised Solutions of Nonlinear PDEs Springer Science & Business Media
This book offers an introduction to the mathematical, probabilistic and numerical methods used in the modern theory of option pricing. The text is designed for readers with a basic mathematical background. The first part contains a presentation of the arbitrage theory in discrete time. In the second part, the theories of stochastic calculus and parabolic PDEs are developed in detail and the classical arbitrage theory is analyzed in a Markovian setting by means of of PDEs techniques. After the martingale representation theorems and the Girsanov theory have been presented, arbitrage pricing is revisited in the martingale theory optics. General tools from PDE and martingale theories are also used in the analysis of volatility modeling. The book also contains an Introduction to Lévy processes and Malliavin calculus. The last part is devoted to the description of the numerical methods used in option pricing: Monte Carlo, binomial trees, finite differences and Fourier transform.

Elementary Stochastic Calculus with Finance in View International Monetary Fund
These notes provide a concise introduction to stochastic differential equations and their application to the study of financial markets and as a basis for modeling diverse physical phenomena. They are accessible to non-specialists and make a valuable addition to the collection of texts on the topic. --Srinivasa Varadhan, New York University This is a handy and very useful text for studying stochastic differential equations. There is enough mathematical detail so that the reader can benefit from this introduction with only a basic background in mathematical analysis and probability. --George Papanicolaou, Stanford University This book covers the most important elementary facts regarding stochastic differential equations; it also describes some of the applications to partial differential equations, optimal stopping, and options pricing. The book's style is intuitive rather than formal, and emphasis is made on clarity. This book will be very helpful to starting graduate students and strong undergraduates as well as to others who want to gain knowledge of stochastic differential equations. I recommend this book enthusiastically. --Alexander Lipton, Mathematical Finance Executive, Bank of America Merrill Lynch This short book provides a quick, but very readable introduction to stochastic differential equations, that is, to differential equations subject to additive ``white noise'' and related random disturbances. The exposition is concise and strongly focused upon the interplay between probabilistic intuition and mathematical rigor. Topics include a quick survey of measure theoretic probability theory, followed by an introduction to

Brownian motion and the Ito stochastic calculus, and finally the theory of stochastic differential equations. The text also includes applications to partial differential equations, optimal stopping problems and options pricing. This book can be used as a text for senior undergraduates or beginning graduate students in mathematics, applied mathematics, physics, financial mathematics, etc., who want to learn the basics of stochastic differential equations. The reader is assumed to be fairly familiar with measure theoretic mathematical analysis, but is not assumed to have any particular knowledge of probability theory (which is rapidly developed in Chapter 2 of the book).

Malliavin Calculus for Lévy Processes with Applications to Finance John Wiley & Sons
"This book provides the reader with basic concepts for soft computing and other methods for various means of uncertainty in handling solutions, analysis, and applications"--Provided by publisher.

SIAM Journal on Control and Optimization Springer Science & Business Media
Stochastic Differential EquationsSpringer Science & Business Media

Applied Stochastic Control of Jump Diffusions Springer Science & Business Media
This paper examines how capital controls affect FDI decisions and how the impact of these restrictive measures varies with different levels of country risk. We construct a model of firms' FDI decisions, broadly in Dunning's "eclectic theory" framework, using "real options" to emphasize economic uncertainty and country risk. Numerical results of the model take the form of "quality statistics" that uncover the underlying dynamics hidden in the aggregate data that is responsible for the low performance of recent empirical studies. We find that increasing levels of capital controls reduce the life-span of FDI investments at each level of country risk and foreign investors' willingness towards risk sharing increases. We reveal a significant interaction between capital control and country risk, resulting in a nonlinear relationship between these and the volatility and volume statistics. We estimate a standard cross-sectional model that provides strong support for our theoretical findings.

Stochastic Processes and Calculus Springer
This volume contains the contributions of the participants of the Sixth Oslo-Silivri Workshop on Stochastic Analysis, held in Geilo from July 29 to August 6, 1996. There are two main lectures " Stochastic Differential Equations with Memory, by S.E.A. Mohammed, " Backward SDE's and Viscosity Solutions of Second Order Semilinear PDE's, by E. Pardoux. The main lectures are presented at the beginning of the volume. There is also a review paper at the third place about the stochastic calculus of variations on Lie groups. The contributing papers vary from SPDEs to Non-Kolmogorov type probabilistic models. We would like to thank " VISTA, a research cooperation between Norwegian Academy of Sciences and Letters and Den Norske Stats Oljeselskap (Statoil), " CNRS, Centre National de la Recherche Scientifique, " The Department of Mathematics of the University of Oslo, " The Ecole Nationale Superieure des Telecommunications, for their financial support. L. Decreusefond J. Gjerde B. 0ksendal A.S. Ustunel PARTICIPANTS TO THE 6TH WORKSHOP ON STOCHASTIC ANALYSIS Vestlia HØyfjellshotell, Geilo, Norway, July 28 -August 4, 1996. E-mail: abc@gfm.cii.fc.ui.pt Aureli ALABERT Departament de Matematiques Laurent DECREUSEFOND Universitat Autonoma de Barcelona Ecole Nationale Superieure des Telecom 08193-Bellaterra munications CATALONIA (Spain) Departement Reseaux E-mail: alabert@mat.uab.es 46, rue Barrault Halvard ARNTZEN 75634 Paris Cedex 13 Dept. of Mathematics FRANCE University of Oslo E-mail: decreuse@res.enst.fr Box 1053 Blindern Laurent DENIS N-0316 Oslo C.M.I

Introduction to Stochastic Differential Equations with Applications to Modelling in Biology and Finance Springer Science & Business Media
Here is a rigorous introduction to the most important and useful solution methods of various types of stochastic control problems for jump diffusions and its applications. Discussion includes the dynamic programming method and the maximum principle method, and their relationship. The text emphasises real-world applications, primarily in finance. Results are illustrated by examples, with end-of-chapter exercises including complete solutions. The 2nd edition adds a chapter on optimal control of stochastic partial differential equations driven by Lévy processes, and a new section on optimal stopping with delayed information. Basic knowledge of stochastic analysis, measure theory and partial differential equations is assumed.

Applied Intertemporal Optimization Springer
This book provides a systematic and accessible approach to stochastic differential equations, backward stochastic differential equations, and their connection with partial differential equations, as well as the recent development of the fully nonlinear theory, including nonlinear expectation, second order backward stochastic differential equations, and path dependent partial differential equations. Their main applications and numerical algorithms, as well as many exercises, are included. The book focuses on ideas and clarity, with most results having been solved from scratch and most theories being motivated from applications. It can be considered a starting point for junior researchers in the field, and can serve as a textbook for a two-semester graduate course in probability theory and stochastic analysis. It is also accessible for graduate students majoring in financial engineering.

Stochastic Analysis and Related Topics VI IGI Global
The book describes both mathematical and computational tools for energy and power risk management, deriving from first principles stochastic models for simulating commodity risk and how to design robust C++ to implement these models.

Asymptotic Properties of the Solutions to Stochastic KPP Equations CRC Press
This compact yet thorough text zeros in on the parts of the

theory that are particularly relevant to applications . It begins with a description of Brownian motion and the associated stochastic calculus, including their relationship to partial differential equations. It solves stochastic differential equations by a variety of methods and studies in detail the one-dimensional case. The book concludes with a treatment of semigroups and generators, applying the theory of Harris chains to diffusions, and presenting a quick course in weak convergence of Markov chains to diffusions. The presentation is unparalleled in its clarity and simplicity. Whether your students are interested in probability, analysis, differential geometry or applications in operations research, physics, finance, or the many other areas to which the subject applies, you'll find that this text brings together the material you need to effectively and efficiently impart the practical background they need.

Stochastic Differential Equations in Infinite Dimensions Springer Science & Business Media
With this hands-on introduction readers will learn what SDEs are all about and how they should use them in practice.

The Fascination of Probability, Statistics and their Applications Springer
Control theory provides a large set of theoretical and computational tools with applications in a wide range of ?elds, running from ”pure” branches of mathematics, like geometry, to more applied areas where the objective is to ?nd solutions to ”real life” problems, as is the case in robotics, control of industrial processes or ?nance. The ”high tech” character of modern business has increased the need for advanced methods. These rely heavily on mathematical techniques and seem indispensable for competitiveness of modern enterprises. It became essential for the ?nancial analyst to possess a high level of mathematical skills. C- versely, the complex challenges posed by the problems and models relevant to ?nance have, for a long time, been an important source of new research topics for mathematicians. The use of techniques from stochastic optimal control constitutes a well established and important branch of mathematical ?nance. Up to now, other branches of control theory have found comparatively less application in ?n- cial problems. To some extent, deterministic and stochastic control theories developed as di?erent branches of mathematics. However, there are many points of contact between them and in recent years the exchange of ideas between these ?elds has intensi?ed. Some concepts from stochastic calculus (e.g., rough paths) havedrawn theattentionofthedeterministi ccontroltheorycommunity.Also, some ideas and tools usual in deterministic control (e.g., geometric, algebraic or functional-analytic methods) can be successfully applied to stochastic c- trol.

Stochastic Analysis and Applications Springer
This book is based on research that, to a large extent, started around 1990, when a research project on fluid flow in stochastic reservoirs was initiated by a group including some of us with the support of VISTA, a research coopera tion between the Norwegian Academy of Science and Letters and Den norske stats oljeselskap A.S. (Statoil). The purpose of the project was to use stochastic partial differential equations (SPDEs) to describe the flow of fluid in a medium where some of the parameters, e.g., the permeability, were stochastic or "noisy". We soon realized that the theory of SPDEs at the time was insufficient to handle such equations. Therefore it became our aim to develop a new mathematically rigorous theory that satisfied the following conditions. 1) The theory should be physically meaningful and realistic, and the corre sponding solutions should make sense physically and should be useful in applications. 2) The theory should be general enough to handle many of the interesting SPDEs that occur in reservoir theory and related areas. 3) The theory should be strong and efficient enough to allow us to solve th,~se SPDEs explicitly, or at least provide algorithms or approximations for the solutions.