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Malliavin Calculus for Lévy Processes with Applications to Finance - Giulia Di Nunno
2008-10-08
This book is an introduction to Malliavin calculus as a generalization of the classical non-anticipating Ito calculus to an anticipating setting. It presents the development of the theory and its use in new fields of application.

Stochastic Analysis in Discrete and Continuous Settings - Nicolas Privault 2009-07-14

This monograph is an introduction to some aspects of stochastic analysis in the framework of normal martingales, in both discrete and continuous time. The text is mostly self-contained, except for Section 5.7 that requires some background in geometry, and should be accessible to graduate students and researchers having already received a basic training in probability. Prereq- sites are mostly limited to a knowledge of measure theory and probability, namely?-algebras,expectations,andconditionalexpectations.Ashortint- duction to stochastic calculus for continuous and jump processes is given in Chapter 2 using normal martingales, whose predictable quadratic variation is the Lebesgue measure. There already exists several books devoted to stochastic analysis for c- tinuous di?usion processes on Gaussian and Wiener spaces, cf. e.g. [51], [63], [65], [72], [83], [84], [92], [128], [134], [143], [146], [147]. The particular f- ture of this text is to simultaneously consider continuous processes and jump processes in the uni?ed framework of normal martingales.

A Panorama of Modern Operator Theory and Related Topics - Harry Dym 2012-02-01

This book is dedicated to the memory of Israel Gohberg (1928–2009) – one of the great mathematicians of our time – who inspired innumerable fellow mathematicians and directed many students. The volume reflects the wide spectrum of Gohberg's mathematical interests. It consists of more than 25 invited and peer-reviewed original research papers written by his former students, co-authors and friends. Included are contributions to single and multivariable operator theory, commutative and non-commutative Banach algebra theory, the theory of matrix polynomials and analytic vector-valued functions, several variable complex

function theory, and the theory of structured matrices and operators. Also treated are canonical differential systems, interpolation, completion and extension problems, numerical linear algebra and mathematical systems theory.
Stochastic Calculus - Richard Durrett 2018-03-29
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 Partial Differential Equations - Helge Holden 2013-12-01
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.

Introduction to Hida Distributions - Si Si 2012
This book provides the mathematical definition of white noise and gives its significance. White noise is in fact a typical class of idealized elemental (infinitesimal) random variables. Thus, we are naturally led to have functionals of such elemental random variables that is white noise. This book analyzes those functionals of white noise, particularly the generalized ones called Hida distributions, and highlights some interesting future directions. The main part of the book involves infinite dimensional differential and integral calculus based on the variable which is white noise.The present book can be used as a supplementary book to Lectures on White Noise Functionals published in 2008, with detailed background provided.

Stochastic Analysis, Stochastic Systems, and Applications to Finance - Allanus Hak-Man Tsoi 2011
This book introduces some advanced topics in probability theories ? both pure and applied ? is divided into two parts. The first part deals with the analysis of stochastic dynamical systems, in terms of Gaussian processes, white noise theory, and diffusion processes. The second part of the book discusses some up-to-date applications of optimization theories, martingale measure theories, reliability theories, stochastic filtering theories and stochastic algorithms towards mathematical finance issues such as option

pricing and hedging, bond market analysis, volatility studies and asset trading modeling.

Advanced Mathematical Approach to Biology - Takeyuki Hida 1997
This volume consists of three papers, the first paper by T Ray aims to create an instantiation of evolution by natural selection in the computational medium. This creates a conceptual problem that requires considerable art to solve.The second paper by K-I Naka and V Bhanot discusses an interesting application of white noise analysis to the retinal physiology. It deals with identification of the retina mathematically, and one can see profound results that can be discovered only by using white noise analysis.The last paper by T Hida illustrates the use of white noise analysis for biologists. Readers will see the types of topics to which white noise analysis can be applied and how to apply the theory to actual phenomena.

Recent Developments in Infinite-Dimensional Analysis and Quantum

Probability - Luigi Accardi 2012-12-06
Recent Developments in Infinite-Dimensional Analysis and Quantum Probability is dedicated to Professor Takeyuki Hida on the occasion of his 70th birthday. The book is more than a collection of articles. In fact, in it the reader will find a consistent editorial work, devoted to attempting to obtain a unitary picture from the different contributions and to give a comprehensive account of important recent developments in contemporary white noise analysis and some of its applications. For this reason, not only the latest results, but also motivations, explanations and connections with previous work have been included. The wealth of applications, from number theory to signal processing, from optimal filtering to information theory, from the statistics of stationary flows to quantum cable equations, show the power of white noise analysis as a tool. Beyond these, the authors emphasize its connections with practically all branches of contemporary

probability, including stochastic geometry, the structure theory of stationary Gaussian processes, Neumann boundary value problems, and large deviations.

White Noise Theory of Prediction, Filtering and Smoothing - Gopinath Kallianpur 1988-01-01 Based on the author's own research, this book rigorously and systematically develops the theory of Gaussian white noise measures on Hilbert spaces to provide a comprehensive account of nonlinear filtering theory. Covers Markov processes, cylinder and quasi-cylinder probabilities and conditional expectation as well as predictio0n and smoothing and the varied processes used in filtering. Especially useful for electronic engineers and mathematical statisticians for explaining the systematic use of finely additive white noise theory leading to a more simplified and direct presentation.

Real and Stochastic AnalysisRecent Advances - M.M. Rao 1997-03-06 Real and Stochastic Analysis: Recent Advances

presents a carefully edited collection of research articles written by research mathematicians and highlighting advances in RSA. A balanced blend of both theory and applications, this book covers six aspects of stochastic analysis in depth and detail. The first chapters cover the state of the art in tracers analysis, stochastic modeling as it applies to AIDS epidemiology, and the current state of higher order SDEs. Subsequent chapters present a simple approach to Gaussian dichotomy, an overview of harmonizable processes, and stochastic Fubini and Green theorems. Common to all the chapters, the employment of functional analytic methods creates a unified approach. Each chapter includes detailed proofs. Throughout the book, a substantial amount of new material is presented, much of it for the first time. This forward-looking work presents current accounts of important areas of research, evaluates recent advances, and identifies research frontiers and new challenges.

Equations Involving Malliavin Calculus Operators - Tijana Levajković 2017-08-31
This book provides a comprehensive and unified introduction to stochastic differential equations and related optimal control problems. The material is new and the presentation is reader-friendly. A major contribution of the book is the development of generalized Malliavin calculus in the framework of white noise analysis, based on chaos expansion representation of stochastic processes and its application for solving several classes of stochastic differential equations with singular data involving the main operators of Malliavin calculus. In addition, applications in optimal control and numerical approximations are discussed. The book is divided into four chapters. The first, entitled White Noise Analysis and Chaos Expansions, includes notation and provides the reader with the theoretical background needed to understand the subsequent chapters. In Chapter 2, Generalized Operators of Malliavin Calculus, the Malliavin derivative operator, the Skorokhod integral and the Ornstein-Uhlenbeck operator are introduced in terms of chaos expansions. The main properties of the operators, which are known in the literature for the square integrable processes, are proven using the chaos expansion approach and extended for generalized and test stochastic processes. Chapter 3, Equations involving Malliavin Calculus operators, is devoted to the study of several types of stochastic differential equations that involve the operators of Malliavin calculus, introduced in the previous chapter. Fractional versions of these operators are also discussed. Finally, in Chapter 4, Applications and Numerical Approximations are discussed. Specifically, we consider the stochastic linear quadratic optimal control problem with different forms of noise disturbances, operator differential algebraic equations arising in fluid dynamics, stationary equations and fractional versions of the equations studied – applications never covered

in the extant literature. Moreover, numerical validations of the method are provided for specific problems."

An Introduction to Continuous-Time Stochastic Processes - Vincenzo Capasso 2021-06-18 This textbook, now in its fourth edition, offers a rigorous and self-contained introduction to the theory of continuous-time stochastic processes, stochastic integrals, and stochastic differential equations. Expertly balancing theory and applications, it features concrete examples of modeling real-world problems from biology, medicine, finance, and insurance using stochastic methods. No previous knowledge of stochastic processes is required. Unlike other books on stochastic methods that specialize in a specific field of applications, this volume examines the ways in which similar stochastic methods can be applied across different fields. Beginning with the fundamentals of probability, the authors go on to introduce the theory of stochastic processes, the Itô Integral, and stochastic differential equations. The following chapters then explore stability, stationarity, and ergodicity. The second half of the book is dedicated to applications to a variety of fields, including finance, biology, and medicine. Some highlights of this fourth edition include a more rigorous introduction to Gaussian white noise, additional material on the stability of stochastic semigroups used in models of population dynamics and epidemic systems, and the expansion of methods of analysis of one-dimensional stochastic differential equations. An Introduction to Continuous-Time Stochastic Processes, Fourth Edition is intended for graduate students taking an introductory course on stochastic processes, applied probability, stochastic calculus, mathematical finance, or mathematical biology. Prerequisites include knowledge of calculus and some analysis; exposure to probability would be helpful but not required since the necessary fundamentals of measure and integration are provided.

Researchers and practitioners in mathematical finance, biomathematics, biotechnology, and engineering will also find this volume to be of interest, particularly the applications explored in the second half of the book.

White Noise Distribution Theory - Hui-Hsiung Kuo 1996-04-17
Learn the basics of white noise theory with White Noise Distribution Theory. This book covers the mathematical foundation and key applications of white noise theory without requiring advanced knowledge in this area. This instructive text specifically focuses on relevant application topics such as integral kernel operators, Fourier transforms, Laplacian operators, white noise integration, Feynman integrals, and positive generalized functions. Extremely well-written by one of the field's leading researchers, White Noise Distribution Theory is destined to become the definitive introductory resource on this challenging topic.
The Feynman Integral and Feynman's

Operational Calculus - Gerald W. Johnson 2000-03-16
This book provides the most comprehensive mathematical treatment to date of the Feynman path integral and Feynman's operational calculus. It is accessible to mathematicians, mathematical physicists and theoretical physicists. Including new results and much material previously only available in the research literature, this book discusses both the mathematics and physics background that motivate the study of the Feynman path integral and Feynman's operational calculus, and also provides more detailed proofs of the central results.
Probability Theory and Mathematical Statistics - 2020-05-28

Innovation Approach To Random Fields, An: Application Of White Noise Theory - Takeyuki Hida 2004-07-14
A random field is a mathematical model of

evolutional fluctuating complex systems parametrized by a multi-dimensional manifold like a curve or a surface. As the parameter varies, the random field carries much information and hence it has complex stochastic structure.The authors of this book use an approach that is characteristic: namely, they first construct innovation, which is the most elemental stochastic process with a basic and simple way of dependence, and then express the given field as a function of the innovation. They therefore establish an infinite-dimensional stochastic calculus, in particular a stochastic variational calculus. The analysis of functions of the innovation is essentially infinite-dimensional. The authors use not only the theory of functional analysis, but also their new tools for the study.

Quantum Probability and Infinite Dimensional Analysis - Habib Ouerdiane 2010
This is the proceedings of the 29th Conference on Quantum Probability and Infinite Dimensional Analysis, which was held in Hammamet, Tunisia.

Stochastic Analysis: Classical and Quantum -

Probability Towards 2000 - L. Accardi 2012-12-06
Senior probabilists from around the world with widely differing specialities gave their visions of the state of their specialty, why they think it is important, and how they think it will develop in the new millenium. The volume includes papers given at a symposium at Columbia University in 1995, but papers from others not at the meeting were added to broaden the coverage of areas. All papers were refereed.
Quantum Probability and Infinite Dimensional Analysis -

Probability Theory and Mathematical Statistics - Bronius Grigelionis 1999
The 7th Vilnius Conference on Probability Theory and Mathematical Statistics was held together with the 22nd European Meeting of Statisticians, 12--18 August 1998. This

Proceedings volume contains invited lectures as well as some selected contributed papers. Topics included in the conference are: general inference; time series; statistics and probability in the life sciences; statistics and probability in natural and social science; applied probability; probability.

Handbook of Stochastic Analysis and Applications - D. Kannan 2001-10-23
An introduction to general theories of stochastic processes and modern martingale theory. The volume focuses on consistency, stability and contractivity under geometric invariance in numerical analysis, and discusses problems related to implementation, simulation, variable step size algorithms, and random number generation.

Numerical Methods for Stochastic Partial Differential Equations with White Noise - Zhongqiang Zhang 2017-09-01
This book covers numerical methods for stochastic partial differential equations with white noise using the framework of Wong-Zakai approximation. The book begins with some motivational and background material in the introductory chapters and is divided into three parts. Part I covers numerical stochastic ordinary differential equations. Here the authors start with numerical methods for SDEs with delay using the Wong-Zakai approximation and finite difference in time. Part II covers temporal white noise. Here the authors consider SPDEs as PDEs driven by white noise, where discretization of white noise (Brownian motion) leads to PDEs with smooth noise, which can then be treated by numerical methods for PDEs. In this part, recursive algorithms based on Wiener chaos expansion and stochastic collocation methods are presented for linear stochastic advection-diffusion-reaction equations. In addition, stochastic Euler equations are exploited as an application of stochastic collocation methods, where a numerical comparison with other integration methods in random space is made.

Part III covers spatial white noise. Here the authors discuss numerical methods for nonlinear elliptic equations as well as other equations with additive noise. Numerical methods for SPDEs with multiplicative noise are also discussed using the Wiener chaos expansion method. In addition, some SPDEs driven by non-Gaussian white noise are discussed and some model reduction methods (based on Wick-Malliavin calculus) are presented for generalized polynomial chaos expansion methods. Powerful techniques are provided for solving stochastic partial differential equations. This book can be considered as self-contained. Necessary background knowledge is presented in the appendices. Basic knowledge of probability theory and stochastic calculus is presented in Appendix A. In Appendix B some semi-analytical methods for SPDEs are presented. In Appendix C an introduction to Gauss quadrature is provided. In Appendix D, all the conclusions which are needed for proofs are presented, and in Appendix E a method to compute the convergence rate empirically is included. In addition, the authors provide a thorough review of the topics, both theoretical and computational exercises in the book with practical discussion of the effectiveness of the methods. Supporting Matlab files are made available to help illustrate some of the concepts further. Bibliographic notes are included at the end of each chapter. This book serves as a reference for graduate students and researchers in the mathematical sciences who would like to understand state-of-the-art numerical methods for stochastic partial differential equations with white noise.
An Introduction to Probability and Stochastic Processes - James L. Melsa 2013-09-18 Detailed coverage of probability theory, random variables and their functions, stochastic processes, linear system response to stochastic processes, Gaussian and Markov processes, and stochastic differential equations. 1973 edition.
Stochastic Processes, Finance and Control -

Samuel N. Cohen 2012
This book consists of a series of new, peer-reviewed papers in stochastic processes, analysis, filtering and control, with particular emphasis on mathematical finance, actuarial science and engineering. Paper contributors include colleagues, collaborators and former students of Robert Elliott, many of whom are world-leading experts and have made fundamental and significant contributions to these areas.This book provides new important insights and results by eminent researchers in the considered areas, which will be of interest to researchers and practitioners. The topics considered will be diverse in applications, and will provide contemporary approaches to the problems considered. The areas considered are rapidly evolving. This volume will contribute to their development, and present the current state-of-the-art stochastic processes, analysis, filtering and control.Contributing authors include: H Albrecher, T Bielecki, F Dufour, M Jeanblanc, I Karatzas, H-H Kuo, A Melnikov, E Platen, G Yin, Q Zhang, C Chiarella, W Fleming, D Madan, R Mamon, J Yan, V Krishnamurthy.
White Noise Distribution Theory - Hui-Hsiung Kuo 2018-05-04
Learn the basics of white noise theory with White Noise Distribution Theory. This book covers the mathematical foundation and key applications of white noise theory without requiring advanced knowledge in this area. This instructive text specifically focuses on relevant application topics such as integral kernel operators, Fourier transforms, Laplacian operators, white noise integration, Feynman integrals, and positive generalized functions. Extremely well-written by one of the field's leading researchers, White Noise Distribution Theory is destined to become the definitive introductory resource on this challenging topic.
Proceedings of the International Conference on Stochastic Analysis and Applications - Sergio Albeverio 2013-03-20

Stochastic analysis is a field of mathematical research having numerous interactions with other domains of mathematics such as partial differential equations, riemannian path spaces, dynamical systems, optimization. It also has many links with applications in engineering, finance, quantum physics, and other fields. This book covers recent and diverse aspects of stochastic and infinite-dimensional analysis. The included papers are written from a variety of standpoints (white noise analysis, Malliavin calculus, quantum stochastic calculus) by the contributors, and provide a broad coverage of the subject. This volume will be useful to graduate students and research mathematicians wishing to get acquainted with recent developments in the field of stochastic analysis.
Tools for Infinite Dimensional Analysis - Jeremy J. Becnel 2020-12-21
Over the past six decades, several extremely important fields in mathematics have been developed. Among these are Itô calculus, Gaussian measures on Banach spaces, Malliavan calculus, and white noise distribution theory. These subjects have many applications, ranging from finance and economics to physics and biology. Unfortunately, the background information required to conduct research in these subjects presents a tremendous roadblock. The background material primarily stems from an abstract subject known as infinite dimensional topological vector spaces. While this information forms the backdrop for these subjects, the books and papers written about topological vector spaces were never truly written for researchers studying infinite dimensional analysis. Thus, the literature for topological vector spaces is dense and difficult to digest, much of it being written prior to the 1960s. Tools for Infinite Dimensional Analysis aims to address these problems by providing an introduction to the background material for infinite dimensional analysis that is friendly in style and accessible to graduate students and

researchers studying the above-mentioned subjects. It will save current and future researchers countless hours and promote research in these areas by removing an obstacle in the path to beginning study in areas of infinite dimensional analysis. Features Focused approach to the subject matter Suitable for graduate students as well as researchers Detailed proofs of primary results
White Noise on Bialgebras - Michael Schurmann 1993
Stochastic processes with independent increments on a group are generalized to the concept of "white noise" on a Hopf algebra or bialgebra. The main purpose of the book is the characterization of these processes as solutions of quantum stochastic differential equations in the sense of R.L. Hudsonand K.R. Parthasarathy. The notes are a contribution to quantum probability but they are also related to classical probability, quantum groups, and operator algebras. The Az ma martingales appear as examples of white noise on a Hopf algebra which is a deformation of the Heisenberg group. The book will be of interest to probabilists and quantum probabilists. Specialists in algebraic structures who are curious about the role of their concepts in probablility theory as well as quantum theory may find the book interesting. The reader should havesome knowledge of functional analysis, operator algebras, and probability theory.
Stochastic Processes, Finance and Control - Samuel N Cohen 2012-08-10
This book consists of a series of new, peer-reviewed papers in stochastic processes, analysis, filtering and control, with particular emphasis on mathematical finance, actuarial science and engineering. Paper contributors include colleagues, collaborators and former students of Robert Elliott, many of whom are world-leading experts and have made fundamental and significant contributions to these areas. This book provides new important

insights and results by eminent researchers in the considered areas, which will be of interest to researchers and practitioners. The topics considered will be diverse in applications, and will provide contemporary approaches to the problems considered. The areas considered are rapidly evolving. This volume will contribute to their development, and present the current state-of-the-art stochastic processes, analysis, filtering and control. Contributing authors include: H Albrecher, T Bielecki, F Dufour, M Jeanblanc, I Karatzas, H-H Kuo, A Melnikov, E Platen, G Yin, Q Zhang, C Chiarella, W Fleming, D Madan, R Mamon, J Yan, V Krishnamurthy. Contents:Stochastic Analysis:On the Connection Between Discrete and Continuous Wick Calculus with an Application to the Fractional Black-Scholes Model (C Bender and P Parczewski)Malliavin Differentiability of a Class of Feller-Diffusions with Relevance in Finance (C-O Ewald, Y Xiao, Y Zou and T K Siu)A Stochastic Integral for Adapted and Instantly Independent Stochastic Processes (H-H Kuo, A Sae-Tang and B Szozda)Independence of Some Multiple Poisson Stochastic Integrals with Variable-Sign Kernels (N Privault)Differential and Stochastic Games:Strategies for Differential Games (W H Fleming and D Hernández-Hernández)BSDE Approach to Non-Zero-Sum Stochastic Differential Games of Control and Stopping (I Karatzas and Q Li)Mathematical Finance:On Optimal Dividend Strategies in Insurance with a Random Time Horizon (H Albrecher and S Thonhauser)Counterparty Risk and the Impact of Collateralization in CDS Contracts (T R Bielecki, I Cialenco and I Iyigunler)A Modern View on Merton's Jump-Diffusion Model (G H L Cheang and C Chiarella)Hedging Portfolio Loss Derivatives with CDS's (A Cousin and M Jeanblanc)New Analytic Approximations for Pricing Spread Options (J van der Hoek and M W Korolkiewicz)On the Polynomial–Normal Model and Option Pricing (H Li and A Melnikov)A

Functional Transformation Approach to Interest Rate Modelling(S Luo, J Yan and Q Zhang)S&P 500 Index Option Surface Drivers and Their Risk Neutral and Real World Quadratic Covariations (D B Madan)A Dynamic Portfolio Approach to Asset Markets and Monetary Policy (E Platen and W Semmler)Mean-Variance Portfolio Selection Under Regime-Switching Diffusion Asset Models: A Two-Time-Scale Limit (G Yin and Y Talafha)Filtering and Control:Existence and Uniqueness of Solutions for a Partially Observed Stochastic Control Problem (A Bensoussan, M Çakanyildirim, M Li and S P Sethi)Continuous Control of Piecewise Deterministic Markov Processes with Long Run Average Cost (O L V Costa and F Dufour)Stochastic Linear-Quadratic Control Revisited (T E Duncan)Optimization of Stochastic Uncertain Systems: Entropy Rate Functionals, Minimax Games and Robustness (F Rezaei, C D Charalambous and N U Ahmed)Gradient Based Policy Optimization of Constrained Markov Decision Processes (V Krishnamurthy and F J Vázquez Abad)Parameter Estimation of a Regime-Switching Model Using an Inverse Stieltjes Moment Approach (X Xi, M R Rodrigo and R S Mamon)An Optimal Inventory-Price Coordination Policy (H Zhang and Q Zhang) Readership: Researchers and professionals in stochastic processes, analysis, filtering and control. Keywords:Stochastic Processes;Filtering;Stochastic Control;Stochastic Analysis;Mathematical Finance;Actuarial Sciences;EngineeringKey Features:This is a festschrift of Professor Robert J Elliott, who is a world leader in the areas of stochastic processes, filtering, control as well as their applicationsIncludes contributions of many world-leading scholars in the fieldsContain many original and fundamental results in the fields rare in competing titles

Infinite Dimensional Stochastic Analysis - Hui-Hsiung Kuo 2008
This volume contains current work at the

frontiers of research in infinite dimensional stochastic analysis. It presents a carefully chosen collection of articles by experts to highlight the latest developments in white noise theory, infinite dimensional transforms, quantum probability, stochastic partial differential equations, and applications to mathematical finance. Included in this volume are expository papers which will help increase communication between researchers working in these areas. The tools and techniques presented here will be of great value to research mathematicians, graduate students and applied mathematicians.
Stochastic Economic Dynamics - Bjarne S. Jensen 2007
This book analyzes stochastic dynamic systems across a broad spectrum in economics and finance. The major unifying theme is the coherent and rigorous treatment of uncertainty and its implications for describing stochastic processes by the stochastic differential equations of the fundamental models in various fields. Pertinent subjects are interrelated, juxtaposed, and examined for consistency in theoretical and empirical contexts. The volume consists of three parts: Developments in Stochastic Dynamics; Stochastic Dynamics in Basic Economic Growth Models; and Intertemporal Optimization in Consumption, Finance, and Growth. Key topics include: fractional Brownian motion in finance; moment evolution of Gaussian and geometric Wiener diffusions; stochastic kinematics and stochastic mechanics; stochastic growth in continuous time; time delays and Hopf bifurcation; consumption and investment strategies; differential systems in finance and life insurance; uncertainty of technological innovations; investment and employment cycles; stochastic control theory; and risk aversion. The works collected in this book serves to bridge the "old" deterministic dynamics and the "new" stochastic dynamics. The collection is important for scholars and advanced graduate students of

economics, statistics, and applied mathematics.

Stochastic Analysis and Related Topics VII - Laurent Decreusefond 2012-12-06
One of the most challenging subjects of stochastic analysis in relation to physics is the analysis of heat kernels on infinite dimensional manifolds. The simplest nontrivial case is that of thepath and loop space on a Lie group. In this volume an up-to-date survey of the topic is given by Leonard Gross, a prominent developer of the theory. Another concise but complete survey of Hausdorff measures on Wiener space and its applications to Malliavin Calculus is given by D. Feyel, one of the most active specialists in this area. Other survey articles deal with short-time asymptotics of diffusion pro cesses with values in infinite dimensional manifolds and large deviations of diffusions with discontinuous drifts. A thorough survey is given of stochas tic integration with respect to the fractional Brownian motion, as well as Stokes' formula for the Brownian sheet, and a new version of the log Sobolev inequality on the Wiener space. Professional mathematicians looking for an overview of the state-of-the art in the above subjects will find this book helpful. In addition, graduate students as well as researchers whose domain requires stochastic analysis will find the original results of interest for their own research. The organizers acknowledge gratefully the financial help ofthe University of Oslo, and the invaluable aid of Professor Bernt 0ksendal and l'Ecole Nationale Superieure des Telecommunications.

An Innovation Approach to Random Fields - Takeyuki Hida 2004
An exploration of random fields. The authors use an approach that firstly constructs innovation, which is the most elemental stochastic process with a basic and simple way of dependence, and then they express the given field as a function of the innovation.

Stochastic Processes, Physics And Geometry Ii - Proceedings Of The Iii International

Conference - Albeverio Sergio 1995-02-17
In the last few years there has been an explosion of activity in the field of the dynamics of fractal surfaces, which, through the convergence of important new results from computer simulations, analytical theories and experiments, has led to significant advances in our understanding of nonequilibrium surface growth phenomena. This interest in surface growth phenomena has been motivated largely by the fact that a wide variety of natural and industrial processes lead to the formation of rough surfaces and interfaces. This book presents these developments in a single volume by bringing together the works containing the most important results in the field.The material is divided into chapters consisting of reprints related to a single major topic. Each chapter has a general introduction to a particular aspect of growing fractal surfaces. These introductory parts are included in order to provide a scientific background to the papers reproduced in the main part of the chapters. They are written in a pedagogical style and contain only the most essential information. The contents of the reprints are made more accessible to the reader as they are preceded by a short description of what the editors find to be the most significant results in the paper.
Stochastic Partial Differential Equations with Additive Gaussian Noise: Analysis and Inference - Ciprian A. Tudor

Stochastic Partial Differential Equations - Helge Holden 2009-12-01
The first edition of Stochastic Partial Differential Equations: A Modeling, White Noise Functional Approach, gave a comprehensive introduction to SPDEs. In this, the second edition, the authors build on the theory of SPDEs driven by space-time Brownian motion, or more generally, space-time Lévy process noise. Applications of the theory are emphasized throughout. The stochastic pressure equation for fluid flow in

porous media is treated, as are applications to finance. Graduate students in pure and applied mathematics as well as researchers in SPDEs, physics, and engineering will find this introduction indispensible. Useful exercises are collected at the end of each chapter.

Introduction to Stochastic Integration - Hui-Hsiung Kuo 2006-02-04
Also called Ito calculus, the theory of stochastic integration has applications in virtually every scientific area involving random functions. This introductory textbook provides a concise introduction to the Ito calculus. From the reviews: "Introduction to Stochastic Integration is exactly what the title says. I would maybe just add a 'friendly' introduction because of the clear presentation and flow of the contents." --THE MATHEMATICAL SCIENCES DIGITAL LIBRARY Finite and Infinite Dimensional Analysis in Honor of Leonard Gross - Analysis on Infinit Ams Special Session 2003
This book contains the proceedings of the special session in honor of Leonard Gross held at the annual Joint Mathematics Meetings in New Orleans (LA). The speakers were specialists in a variety of fields, and many were Professor Gross' former Ph.D. students and their descendants. Papers in this volume present results from several areas of mathematics. They illustrate applications of powerful ideas that originated in Gross' work and permeate diverse fields. Topics of this title include stochastic partial differential equations, white noise analysis, Brownian motion, Segal-Bargmann analysis, heat kernels, and some applications. The volume should be useful to graduate students and researchers. It provides perspective on current activity and on central ideas and techniques in the topics covered.