Probabilités et processus stochastiques

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turns to the deformation theory of monoidal categories and the related deformation theory of monoidal functors, which is a proper generalization of Gerstenhaber's deformation theory of associative algebras. These serve as the building blocks for a deformation theory of braided monoidal categories which gives rise to sequences of Vassiliev invariants of framed links, and clarify their interrelations.

Probabilités et processus stochastiques

O.E. BARNDORFF-NIELSEN, T. MIKOSCH, S.I. RESNICK, (Editors). — **Lévy processes: theory and applications.** — Un vol. relié, 19×26, de X, 415 p. — ISBN 0-8176-4167-X. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

A Lévy process is a continuous-time analogue of a random walk, and as such, is at the cradle of modern theories of stochastic processes. Martingales, Markov processes, and diffusions are extensions and generalizations of these processes. In the past, representatives of the Lévy class were considered most useful for applications to either Brownian motion or the Poisson process. Nowadays the need for modeling jumps, bursts, extremes and other irregular behavior of phenomena in nature and society has led to a renaissance of the theory of general Lévy processes. Researchers and practitioners in fields as diverse as physics, meteorology, statistics, insurance, and finance have rediscovered the simplicity of Lévy processes and their enormous flexibility in modeling tails, dependence and path behavior. This volume describes the state-of-the-art of this rapidly evolving subject with special emphasis on the non-Brownian world. Leading experts present surveys of recent developments, or focus on some most promising applications.

Tim BEDFORD, Roger COOKE. — **Probabilistic risk analysis: foundations and methods.** — Un vol. relié, 18×25, de XX, 393 p. — ISBN 0-521-7730-2. — Prix: £37.50. — Cambridge University Press, Cambridge, 2001.

Drawing on extensive experience in the theory and applications of risk analysis, the authors focus on the conceptual and mathematical foundations underlying the quantification, interpretation and management of risk. They cover standard topics as well as important new subjects such as the use of expert judgement and uncertainty propagation. The relationship of risk analysis to decision making is highlighted in chapters on influence diagrams and decision theory. Finally, the difficulties of choosing metrics to quantify risk, and current regulatory frameworks are discussed.

A.B.CRUZEIRO, J.-C. ZAMBRINI, (Editors). — **Stochastic analysis and mathematical physics.** — Progress in probability, vol. 50. — Un vol. relié, 16×24, de 158 p. — ISBN 0-8176-4246-3. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2001.

Nine survey articles in this volume extend concepts from classical probability and stochastic processes to a number of areas of mathematical physics. Key topics covered: nonlinear stochastic wave equations, completely positive maps, Mehler-type semigroups on Hilbert spaces, entropic projections, martingale problem and Markov uniqueness of infinite-dimensional Nelson diffusions, analysis in geometric probability theory, measure-preserving shifts on the Wiener space, cohomology on loop spaces, and stochastic Volterra equations.

Peter IMKELLER, Jin-Song VON STORCH, (Editors). — **Stochastic climate models.** — Progress in probability, vol. 49. — Un vol. relié, 16,5×24, de XXVII, 398 p. — ISBN 3-7643-6520-X. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

This book presents a collection of articles based on a selection of lectures given at the interdisciplinary Workshop on Stochastic Climate Models held in Chorin, Germany, from May 31 to

June 2, 1999. The emphasis is on reduced models tractable with advanced tools from the area of stochastic processes, stochastic analysis and random dynamical systems. They include popular examples such as box models for the thermohaline ocean circulation and simple models for El Niño. Among the main topics addressed are a comprehensive survey of the hierarchy of climate models ranging from general circulation models to simple energy balance models; a discussion of the origin of stochasticity in climate modelling by separation of fast and slow scale processes such as weather phenomena or astronomical events; a review of relevant mathematical tools such as stochastic partial differential equations, aspects of stochastic dynamics, large deviations, and averaging techniques; several concrete reduced models are discussed together with methods for their approach such as stochastic resonance, localization of waves, or tracer transport in stochastic flows.

Michael KOHLMANN, Shanjian TANG, (Editors). — **Mathematical finance.** — Workshop of the Mathematical Finance Research Project, Konstanz, Germany, October 5-7, 2000. — Trends in mathematics. — Un vol. relié, 16×24, de 374 p. — ISBN 3-7643-6553-6. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

Apart from contributions to the known discrete, Brownian, and Lévy process models, first attempts to describe a market in a reasonable way by a fractional Brownian motion model are presented. As most dynamical financial problems are stochastic filtering or control problems, many talks presented adaptations of control methods and techniques to the classical financial problems in: portfolio selection, irreversible investment, risk sensitive asset allocation, capital asset pricing, hedging contingent claims, option pricing, interest rate theory. The contributions of practitioners link the theoretical results to the steadily increasing flow of real world problems from financial institutions into mathematical laboratories. The present volume reflects this exchange of theoretical and applied results, methods and techniques that made the workshop a fruitful contribution to the interdisciplinary work in mathematical finance.

N. LIMNIOS, G. OPRIŞAN. — **Semi-Markov processes and reliability.** — Statistics for industry and technology. — Un vol. relié, 18,5×26, de XII, 222 p. — ISBN 0-8176-4196-3. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2001.

The theory of stochastic processes, for science and engineering, can be considered as an extension of probability theory allowing modeling of the evolution of systems over time. The modern theory of Markov processes has its origins in the studies of A.A. Markov (1856-1922) on sequences of experiments "connected in a chain" and in the attempts to describe mathematically the physical phenomenon of Brownian motion. The theory of stochastic processes entered in a period of intensive development when the idea of Markov property was brought in. This book is a modern overall view of semi-Markov processes and its applications in reliability. It is accessible to readers with a first course in Probability theory (including the basic notions of Markov chain).

N. BALAKRISHNAN, I.A. IBRAGIMOV, V.B. NEVZOROV, (Editors). — **Asymptotic methods in probability and statistics with applications.** — Statistics for industry and technology. — Un vol. relié, 19×26, de XXIII, 549 p. — ISBN 0-8176-4214-5. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2001.

The book is organized into ten thematic parts: probability distributions; characterizations of distributions; probabilities and measures in high-dimensional structures; weak and strong limit theorems; large deviation probabilities; empirical processes; order statistics and records; estimation of parameters and hypotheses testing; random walks; and applications to finance. Written in an accessible style, the book conveys a clear and practical perspective of asymptotic

methods. Features and topics: Recent developments in asymptotic methods. Parametric and nonparametric inference. Distribution theory. Stochastic processes. Order statistics. Record values and characterizations.

Statistique

Elart VON COLLANI, Klaus DRÄGER. — **Binomial distribution handbook for scientists and engineers.** — Un vol. relié, 16×24, de XVII, 357 p. + 1 CD-ROM. — ISBN 0-8176-4129-7. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

This book deals with estimating and testing the probability of an event. The purpose of the book is twofold: it aims at providing practitioners with refined and easy to use techniques as well as initiating a new field of research in theoretical statistics. The book contains completely new interval and point estimators that are superior to the traditional ones. This is especially true in the case of small and medium sized samples, which are characteristic for many fields of application. The estimators are tailored to a given situation and take into account that generally one knows the size of the probability to be measured. Thus, according the size of the probability, different estimators should be used, similar to the case of measuring length, where the measurement method depends heavily on the size of the length to be measured. This approach yields more precise estimators and more powerful tests. It may also be applied to other estimation problems.

Ludwig FAHRMEIR, Gerhard TUTZ. — **Multivariate statistical modelling based on generalized linear models.** — Second edition. — Springer series in statistics. — Un vol. relié, 16×24, de XXVI, 517 p. — ISBN 0-387-95187-3. — Prix: DM 169.00. — Springer, New York, 2001.

The primary aim of the new edition is to bring the book up-to-date and to reflect on the major new development over the past years. The authors give a detailed introductory survey of the subject based on the analysis of real data drawn from a variety of subjects, including the biological sciences, economics, and the social sciences. Technical details and proofs are deferred to an appendix in order to provide an accessible account for nonexperts. The appendix serves as a reference or brief tutorial for the concepts of the EM algorithm, numerical integration, MCMC, and others. The topics covered include: models for multicategorial responses, model checking, semi- and nonparametric modelling, time series and longitudinal data, random effects models, state-space models, survival analysis.

Samuel KOTZ, Tomasz J. KOZUBOWSKI, Krzysztof PODGÓRSKI. — **The Laplace distribution and generalizations: a revisit with applications to communications, economics, engineering, and finance.** — Un vol. relié, 18×26, de XVIII, 349 p. — ISBN 0-8176-4166-1. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2001.

This monograph focuses on the importance of reviving the Laplace distribution and describes the inferential and modeling advantages that this distribution, together with its generalizations and modifications, offers. After presenting an historical introduction to the subject, the authors cover the univariate Laplace distribution, knowledge of which has until now been scattered in the vast statistical, engineering, and mathematical literature. The multivariate and skewed Laplace distribution are discussed here for the first time in detailed monograph form. Generalizations of Laplace distributions and stochastic processes to which they lead are presented as well. Many results, particularly those on the multivariate and skewed Laplace distribution, appear in print for the first time.