

Statistique

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le comportement qualitatif de ces modèles: existence de régimes stationnaires, caractérisation du comportement à l'équilibre, étude asymptotique du comportement transitoire (événements rares) et des régimes critiques (saturation)...

Statistique

John J. BENEDETTO, Paulo J.S.G. FERREIRA, (Editors). — **Modern sampling theory: mathematics and applications.** — Un vol. relié, $16,5 \times 24$, de xvi, 417 p. — ISBN 0-8176-4023-1. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2001.

Sampling is a fundamental topic in the engineering and physical sciences. This book focuses on recent mathematical methods and theoretical developments, as well as some current central applications of the Classical Sampling Theorem. The Classical Sampling Theorem, which originated in the 19th century, is often associated with the names of Shannon, Kotelnikov, and Whittaker; and one of the features of this book is an English translation of the pioneering work in the 1930s by Kotelnikov, a Russian engineer. Following a technical overview and Kotelnikov's article, the book includes a wide and coherent range of mathematical ideas essential for modern sampling techniques.

Karlheinz GRÖCHENIG. — **Foundations of time-frequency analysis.** — Applied and numerical harmonic analysis. — Un vol. relié, 16×24 , de xv, 359 p. — ISBN 0-8176-4022-3. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

For many years time frequency analysis has been pursued mainly in engineering, but recently, and with the development of wavelet theory, it has emerged as a thriving field of applied mathematics. This book presents the first systematic introduction to time-frequency analysis understood as a central area of applied harmonic analysis, while at the same time honoring its interdisciplinary origins. Important principles are (a) classical Fourier analysis as a tool that is central in modern mathematics, (b) the mathematical structures based on the operations of translation and modulations (i.e. the Heisenberg group), (c) the many forms of the uncertainty principle, and (d) the omnipresence of Gaussian functions, both in the methodology of proofs and in important statements.

Cheng HSIAO, Kimio MORIMUNE, James L. POWELL, (Editors). — **Nonlinear statistical modeling.** — Proceedings of the Thirteenth International Symposium in Economic Theory and Econometrics: Essays in Honor of Takeshi Amemiya. — International Symposia in Economic Theory and Econometrics. — Un vol. relié, $16,5 \times 23,5$, de xviii, 452 p. — ISBN 0-521-66246-X. — Prix: £55.00. — Cambridge University Press, Cambridge, 2001.

This collection brings together important contributions by leading econometricians on parametric approaches to qualitative and sample selection models, nonparametric and semi-parametric approaches to qualitative and sample selection models, and nonlinear estimation of cross-sectional and time series models. The advances achieved here can have important bearing on the choice of methods and analytical techniques in applied research. This collection is dedicated to Professor Takeshi Amemiya in honor of his path-breaking contributions to econometrics and statistics.

Donald B. PERCIVAL, Andrew T. WALDEN. — **Wavelet methods for time series analysis.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, $18,5 \times 25$, de xxv, 594 p. — ISBN 0-521-64068-7. — Prix: £40.00. — Cambridge University Press, Cambridge, 2000.

Data in the form of time series are routinely collected in science, engineering, and other areas such as finance and economics. This is an introduction to wavelet analysis 'from the

ground level and up', and to wavelet-based statistical analysis of time series. It focuses on practical discrete time techniques, with detailed descriptions of the theory and algorithms needed to understand and implement the discrete wavelet transforms. Numerous examples illustrate the techniques on actual time series. The many embedded exercises – with full solutions provided in the appendix – allow use of the book for self-guided study; additional exercises can be used in a classroom setting. A Web site gives access to the time series and wavelets used in the book, as well as information on accessing software in S-Plus and other languages. This book will be welcomed by all students and researchers wishing to use wavelet methods to analyse time series.

B.G. QUINN, E.J. HANNAN. — **The estimation and tracking of frequency.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5×26, de xi, 266 p. — ISBN 0-521-80446-9. — Prix: £37.50. — Cambridge University Press, Cambridge, 2001.

Many electronic and acoustic signals can be modelled as sums of sinusoids and noise. However, the amplitudes, phases and frequencies of the sinusoids are often unknown and must be estimated in order to characterise the periodicity or near-periodicity of the signal. The problem of tracking slow frequency changes over time of a very noisy sinusoid is also considered. Rigorous analyses are presented via asymptotic or large sample theory, together with physical insight. The book focuses on achieving extremely accurate estimates when the signal to noise ratio is low but the sample size is large. Each chapter begins with a detailed overview, and many applications are given. Matlab code for the estimation techniques is also included. The book will thus serve as an excellent introduction and reference for researchers analysing such signals.

Imme VAN DEN BERG. — **Principles of infinitesimal stochastic and financial analysis.** — Un vol. relié, 16×22,5, de xii, 136 p. — ISBN 981-01-4358-8. — Prix: £21.00. — World Scientific, Singapore, 2000.

The setting of this book is the discrete-time version of the Black-Scholes model, namely the Cox-Ross-Rubinstein model. The book gives a complete description of its background, which is now only the theory of finite stochastic processes. The novelty lies in the fact that orders of magnitude — in the sense of nonstandard analysis — are imposed on the parameters of the model. This not only makes the model more economically sound (such as rapid fluctuations of the market being represented by infinitesimal trading periods), but also leads to a significant simplification: the fundamental results of Black-Scholes theory are derived in full generality and with mathematical rigour, now at graduate level. The material has been repeatedly taught in a third-year course to econometricians.

Analyse numérique

Kai BORRE. — **Plane networks and their applications.** — Un vol. relié, 16×24, de x, 170 p. — ISBN 0-8176-4193-9. — Prix: SFr. 88.00. — Birkhäuser, Boston, 2001.

Key features include: Examination of classical mathematical tools for analyzing discrete networks is followed by a new well-developed theory, which is the continuous analogue of a discrete network. — Transition from the discrete to the continuous case described via finite elements: Ch. 3 involves an analysis of linear operators, variational calculus, boundary value problems for PDEs, and Green's functions; Green's functions are the continuous analogue of the discrete error covariance functions, and form the basis all types of error prediction. — Techniques applied to levelling and other observation types of networks in one and two dimensions. — Three different applications of the continuous theory. — Practical problems, supported by MATLAB files, underscore the continuous theory; additional material can be downloaded from the author's website at www.kom.auc.dk/~borre/network.