Book Reviews | Reseñas

Diccionario Técnico Económico Financiero Actuarial

Julio G. Villalón y Josefina Martínez Barbeito [2003]
Netbiblo. S. L. A.
ISBN 84-9745-025-4 864 pp

This is a much-awaited book and it is an acclaimed to-be standard reference for the Spanish speaking community of economists, financiers and actuaries. It has been carefully up-dated with common contemporary words as well as extended terms and phrases. The authors are well known senior professors. The result of their work is this comprehensive reference source. It does not only provided reliable terms in the other language and definitions but helpful further information. There re more than 50 000 entries for translating from English to Spanish and vice versa.

If you are concerned with the theme this book must be in your library.

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Neural networks and sea time series. Reconstruction and extreme/event analysis

B. Tirozzi, S. Puca, Pitallis, A. Bruschi, Morucci, E. Ferraro and S.Corsini (2006)
Birkhäuser
ISBN 10-8176-4347-8 ISBN 13978-0-8176-4347-8 e ISBN 0-8176-4459-8

Modeling and simulation Science, engineering and technology Series.

This book may be considered as a monograph on mathematical modeling of sea phenomena originators of time series. It also can be considered as a book on sea data analysis. These considerations makes of Neural Networks only one method for doing this task.

Chapter 1 introduces the main objectives of the book. The phenomena of surface waves and tides are described. Chapter 2 describes in a more detailed fashion the mechanisms of them. It presents and defines significant wave height (SWH), measurement instruments, as tides gauges, some of the procedures of data collection using a network of buoys, and the institutions involved, National Sea Wave Measurement Network (RON), National Sea Level Measurement Network (RMN)in data collection and analysis. Chapter 3 presents theoretical models for describing SWH and the wave amplitude (WAM) model, which is introduced as well as the free surface problem and the action balance equation. A comparison between WAM and the reconstruction made through NN algorithms is developed. Chapter 4 explains the theory of Artificial NN (ANN), in fact the back-propagation ANN. As the data provided by the time series allow learning on the phenomena the authors models the learning and giving estimates of the probability of an inadequate learning using extreme values distribution results. The exposition is clear and concise, which will be welcome by mathematicians and cursed by informatics. The basics of NN are given en 3 pages, particularities of time series and NN in 1,8 pages and the to-be-used learning algorithms (Steepest Descendent and Simulated Annealing) in 4.2 pages. The generally avoided discussion on how Vapnik-Chernovenenkis Limit Theorem is connected with NN is discussed and the needed particularities on the ergodicity of Monte Carlo dynamics is developed at large. Chapter 5 analyzes how a function can be approximated by a complete set of functions through operators. Chapter 6 describes how the authors dealt for eliciting the probability distributions of extreme events. The so-called peak over threshold (POT) methods is introduced and the main results of Extreme Value distributions are presented considering i.i.d.: Fisher-Tippet theorem, Gumbel Distribution type, Poisson Generalized Pareto model. Their counterparts for stationary stochastic processes are presented. Chapter 7 is devoted to the analysis of the reconstruction of SWH and sea level (SL) using ANN and for re-emplacing the missing data. This without doubt is the main chapter for people involved with this kind of problems. They develop different studies and present how the algorithm and methods that they presented in chapter 4 would be used for studying SL and SWH (correlation properties, NN, Time Series). Chapter 8 considers ANN as a certain

approximation operator and develops the study of data for illustrating that other algorithms (Lenze operator, ARIMA) do not provide more accurate results. Chapter 9 discusses how POT method is applied to study extreme event in time series and the behavior of a reformulated ANN. Chapter 10 is titled Generalization to other phenomena and visits other sets of data (a Californian set of data). The authors use the proposed models and algorithms deriving stimulating results. Chapter 11 gives a set of conclusions derived from the lecture of each chapter.

My evaluation is a that it is good book for mathematicians, physics, engineers and other scientists involved with the study of similar problems. Mathematically-minded will enjoy the presentation of some themes, as NN and extreme value distribution, because the approach will refresh their ideas and, after some work some examples can be used for the classroom and homework.

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Handbook of Computational and Numerical Methods in Finance

Svetlozar T. Rachev (Editor) [2004]
Birkhäuser 95,23€
ISBN 0-8176-3219-0 vii+435

This book is composed by 12 essays and provides a state of the art of the theme.

A preface of the editor gives a brief introduction. The first contribution is due to O.J. Blaskowitz, W.E. Härdle and P. Schmidt. It deals with the study of the influence of the asymmetry of heavy tailed properties distribution in risk neutral problems. This fact implies the need of studying the state of price using non-normal distributions. As we should work with a non-log-normal distribution the implementation of skewness and kurtosis trades should be made within a class of distributions. They analyze the use of Implied Binomial Trees and Kernel based estimation of the volatile. DAX options are used for illustrating the discussions. I. D. D. Souza, K, Amir-Atefi and B. Ratcheva-Jotova are the authors of the second paper. They describe Structural Models (Firms Value) as a source of risk. Similarly they deal with the study of the Reduced Form (Intensity Rate or Hazard) model. The role of credit spread movements and the effect on aggregate bond index is studied. This allows presenting an interesting approach to credit risk modeling where default time and fractional recovery models produce the basic theoretical framework. A similar treatment is given to default-tree, interest rate processes, Baa credit, Spree index, Stable Paretian and non-Gaussian dependence with Copula. Some computing procedures are proposed and they are used for illustrating how to deal with the analyzed models. The third contribution is due to I. Khindanova, Z. Atakhanova and S. Rachev who review the performance of Gaussian GARCH models with respect to statistically motivated procedures based on unconditional distribution models. Databases, derived by energy markets, are analyzed for discussing the convenience of using one model or the other. A. Kohatsu-Higa and M. Montero wrote the next paper. Practitioners interested in theoretical aspects of finance can follow it. Monte Carlo calculations of Greeks (sensitive quantities) provide a link between applicability and mathematical based theory. They discuss some of the existent methods: Kernel function estimation, integration by parts, estimation, Monte Carlo and finite elements methods. Their interpretation is illustrated by examples. They give a remarkable exposition on Malliavin Calculus. P. Kokoszka and A. Purfionovas prepared the fifth paper. It is devoted to expose the possibilities of using re-sampling methods for deriving inferential tools for unit-root studies. Bootstrap was the method analyzed. The use of Monte Carlo methods in financial data is presented for the case in which the distribution is heavy tailed. Composite yields curves bonds are used for establishing how Bootstrap can be used and for discussing its capabilities, for overcoming the difficulties associated with the effect of violations of the usual hypothesis by financial data. How to deal with stable distributions, in the context of Capital Asset Price Modeling, for deriving an optimal portfolio is the theme of the paper of S. Ortobelly, S. Rachev, I. Huber and A. Bligova. Optimization problems are derived and discussed. Financial databases were studied under non-Gaussian distributions and the behavior of the proposed models is discussed. The seventh paper is authored by G. Pagés, H. Pham and J. Printems. It provides an exposition on the use of quantization methods for deriving optimal solutions of the non linear programs appearing in Markov Processes in higher dimensions. Two methods are discussed where the solution should be computed through the utilization of a Stochastic Gradient Descendent algorithm. Four databases are used during the presentation for illustrating how the alternative procedures behave. The authors of the next contribution are S. Stoyanov and B. Racheva-Jotova. They develop a notable discussion on the estimation of the parameters of Stable distributions. Infinite series approximation, Fourier Inverse Integral, Polynomial Tree approximation, Zolatorev representation and the

Approximation of McCulloch are discussed. Quantile, Characteristic Function and Maximum Likelihood estimation procedures and their properties are reviewed. The next paper is due to F. Schlotmann and S. Uryasev who establish a framework for using heuristics as approximation algorithms for solving financial optimization problems. They cover the major classes of algorithms: Hill Climbing, Simulated Annealing, Tabu Search, Genetic Algorithms, Artificial Neural Network and Fuzzy Logic. The chapter ten was prepared by C.E. Testuri and S. Uryasev and it is devoted to develop comparisons of methods, commonly used for portfolio optimization, such as Expected Regret and Conditional Value at Risk (CVaR). A database of 1792 stocks was used for establishing the behavior of them. The paper provides a methodology. The result of the examples computed is that the algorithms behave similarly both in the accuracy of the computed solution and in the computing time needed. S. Trück and Özturkmen review modern numerical procedures that are being introduced in the rating of credit risk models. Their performance was evaluated using financial data. The last contribution is due to S. Zheng where a review, similar to that developed in the previous paper, takes place dealing with the problematic of solving Stochastic Differential Systems. The know-how to use Numerical Methods for solving Partial, Stochastic and Backwards differential equations as well as Stochastic Procedures, Filtering and Residual Structures is the main result.

This book is adequate for those specialists coming from the academy and for practitioners looking for a compendium of modern results in the use of non-Gaussian distributions in Finance. The interest of having this book is motivated by the growing importance of stable distributions for describing financial data and the need of using reliable computational methods for developing the study of the data instead of the seriously biased normal based tools.

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New Trands in the Teory of Hyperbolic equations

Michael Reissig and Bert-Wolfang Schulze (Editors) [2005]
Series Operator Theory Advances and Applications Vol. 169.
Advances in Partial Differential Equations
Birkhäuser 148,00€
ISBN 3-7643-7283-4 xiii+511

This book provides a modern discussion of themes in hyperbolic equations. It is addressed to specialists coming into the fields of evolution equations, multiple characteristics, propagation phenomena, global existence and influence of non-linearizations. As the papers are almost self-contained it will be good referential source for specialists looking for a compendium of modern results in the area. The interest in the theme is motivated by the importance of differential equations in the description of material wave transport in the contemporary world.

The book contains 6 contributions.

The first one is due to P.D´Ancona and V. Georgiev. They discuss how wave maps motivations convey to considering the existence of regularity solutions of the corresponding Cauchy problem. The non-uniqueness of the solution is established. The ill possedness of this problem for Sobolev regularity is studied. Self-similar solutions and effective properties of a family of geodesics, on the target manifold motivated approaches are used in the derivation of the result presented. H. Kubo and M. Ohta are the authors of the second contribution, which presents a set of results in wave equations with small non-linear perturbations and discusses the way in which the transference of wave equation to nonlinear wave equations systems with different propagation speeds. Cauchy problem for non-homogeneous wave equations in L_∞ spaces. It is good source of theoretical instruments for dealing with Maxwell systems. The contribution 3 is due to M. Nakao, whose inequality is used broadly in the theme, devoted his paper to the derivation of local and global decay estimates, for linear wave equations with some local dissipation. They are the supporting results for establishing the existence of solutions for nonlinear wave solutions. In chapter 4 K. Yagdjan obtained a description of the linear Cauchy problem describing the wave map equations where a special constraint is present. In the fifth contribution M. Cicognani and L. Zanghirati analyzed the degeneracies of smooth solutions of weakly hyperbolic Cauchy´s problems. A unified approach is provided. Chapter 6 introduces sharp estimate of the same Cauchy´s problem with time degeneracy.

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Optimization

K. Lange (2004)
Series Springer Texts in Statistics, Springer Verlag ISBN 0-387-20332-X
Xiii+252

This book has been written for specialists. The author adopts a theoretical point of view for treating optimization. The appeal to develop the rationality that conveys to the models is supported by an expected well-trained population of students. A result is more on Interior Methods and less on Simplex.

It contains 11 chapters and an appendix. Chapter 1-3 may be used or not in dependence of the audience. They review exact methods and the mathematical analysis needed. Chapter 4 deals with the theory of Karush-Kunh-Tucker where the Linear Programming problem is used for exemplifying. Chapter 5 gives a description of convexity and its role in applied mathematics (not only optimization but in probability and statistics). Chapters 6 and 7 deal with algorithms of general use that are based on the theory of convexity. This approach conveys to the use of the so-called MM and EM algorithms. The relation of the use of the later in statistics, as a tool for estimating in high dimension, places a special need of a mathematical ability from the reader. The lecture of this chapter of the book provides a philosophical motivation for looking into the regularities of the problems arising in optimization and in statistics through these algorithms. In chapter 8 emerges Gauss-Newton method for establishing the perspectives of well-known algorithms. Chapter 9 follows looking into conjugate gradient, quasi-Newton and trust region algorithmical methods. The essentials of convergence are studied in Chapter 10. In Chapter 11 the author provides an analysis of convex programming, interior point methods and duality. He pointed out that it should be considered as the basis of deeper studies in the theory of optimisation.

A series of problems are proposed in each chapter.

The appendix provides the needed knowledge on the Univariate and Multivariate Normal distribution theory which is used in the book.

123 references are given.

It is a good book for a graduate course in optimisation.

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Testing Statistical Hypothesis: Third Edition. A classic Lehmann and Romano Book

Allan Gut (2005)
Springer xiv-784

This is the 3rd edition of the classic book of Lehman and Romano. This book is divided into two parts. The first one is formed by 10 chapters, which deal with Small Sample Theory. Part II is formed by 5 chapters and is devoted to Large Sample Theory. The edition is devoted to the memory of Le Cam and Tuckey. The theories of multiple comparisons and asymptotic optimality are added to the previous content. This addition is a tribute to their contribution in these themes.

Then we have a modernized advanced book in Statistics, which is covering the main aspects of modern testing theory. It will maintain the role in the library of the previous two. It includes historical notes and problems.

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Monte Carlos Statistical Methods

C.P. ROBERT and G. CASELLA (2004)
Springer Verlag ISBN 0-387-2139-6
XXX+645 89.95 EUROS

This book has been written for specialists but can be used for being initiated in the theme. The authors present an organized compilation of contributions in the area providing also of a usable textbook. The rationality supporting Monte Carlo and Markov Chain methods is conveyed by a discussion of concepts as well as some solid proofs of the main results together with the discussion of the more commonly used algorithm and packagers. No special mathematical abilities are expected from the reader.

The book has 14 chapters. Chapter 1 introduces likelihood and Bayesian concepts and methods. The need of using simulation for coping with the solution of cumbersome problems is motivated. Chapter 2 presents simulation methods that allow generating random variables. Monte Carlo simulation is the theme of the next three chapters. [approximation of integrals, estimation and control of the variance, solution of stochastic search, approximations to the objective function, simulated annealing and EM Algorithms basically]. Chapters from 6 to 11 are devoted to Markov Chain simulation theory and usage [introduction to the method, presentation of the main results on convergence, the Metropolis-Hastings algorithm, the slice sampler, Gibes sampler and reversible jumps algorithms mainly]. Chapter 12 is concerned with the discussion of the software named CODA as a mean of assuring convergence. The rest of the chapters presents the latest developments in the field.

The algorithms are presented in pseudo code and the use of web-available codes written C and Bugs software is pointed out.

If your research involves from time to time the need of using simulation: this is your book. Note that it can be used as a textbook for graduate courses. It provides a large set of exercises and examples.

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