

BOOK REVIEW / RESEÑAS

SYSTEM MODELLING AND OPTIMIZATION. METHODS, THEORY AND APPLICATIONS.

M.J.D. Powell and S. Scholtes (Editors)
Kluwer Academic Publishers, Hingham (2000) ISBN 0-7923-7881-4
xi+360

This book presents some of the papers presented at the XIXth Conference of the Technical Committee 7 of the International Federation of Information Processing (IFIP). It was held in Cambridge, England, during the period 12-16 July, 1999. This conference is the most important of the specialized IFIP's congresses in the theme. Some submitted papers are published in the book. It is a small sample of the delivered talks which was determined through an exigent reviewing process.

The general themes of the conference were Systems Theory, Optimization and related Computation Problems. The main subjects of the papers were Mathematical Programming (non linear, integer, semidefinite), Optimization (stochastic, bilevel), Dynamical Systems, Interior Points Methods and Stability Analysis.

The contributors are very well known specialists. I recommend this book for professionals which need of the knowledge of new theoretical developments in the areas covered by the papers.

C. Bouza
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OPTIMIZACION DINAMICA

Emilio Cerdá Tena (2001)
Prentice Hall, Madrid., ISBN 84-205-2937-0
xii-321

Este es un notable libro que es resultado de la amplia experiencia docente del autor quien imparte la asignatura homónima en la licenciatura de Economía de la Universidad Complutense de Madrid. Este es dividido en cuatro partes.

En el capítulo primero se hace una introducción al tema. Esto es logrado brillantemente. Cuatro ejemplos de la economía fueron utilizados lo que no solo resulta motivante para los economistas sino muy ilustrativo en general, pienso en matemáticos e ingenieros, de la potencialidades prácticas de las herramientas de la Optimización Dinámica. Un recorrido histórico del desarrollo de las ideas de esta rama de la optimización es presentado. Este capítulo es el único que compone la Parte 1. En la Parte 2 se discute con fluidez el problema básico del cálculo de variaciones así como su extensión al caso multivariante. En ella se discute la variopinta de la problemática de las restricciones y de que el funcional objetivo dependa de diferenciales de orden superior. La tercera parte se dedica a discutir el problema del Control Optimal en tiempo continuo y la siguiente cuando el tiempo es discreto.

En todos los capítulos se desarrollan ejemplos ilustrativos y se proponen ejercicios hasta totalizar alrededor de cien.

Un apéndice sirve de introducción y motivación al Control Estocástico a Tiempo Discreto.

Yo le recomiendo para los cursos de Optimización donde este tema sea tratado. Su uso en diversas universidades españolas ha sido exitoso.

Ramiro Rodeiro Pérez
Instituto de Estudios Económicos y Contables

OPERATOR APPROACH TO LINEAR PROBLEMS OF HYDRODYNAMICS

Volume 1. Self -adjoin Problems for an Ideal Fluid.
Nicolay D. Kopachovsky and Selim G. Krein (2001)
Birkhäuser Verlag, Basel, ISBN 3-7643-5406-2 xxiv-384

This book grew out of the experience of the two authors with the applications of functional Analysis to Hydrodynamics. The central theme is the study of hydrodynamic systems which contain an ideal fluid. The first part is devoted to the problem associated with the needed Functional Analysis contents of linear hydrodynamics and for viscous fluids. The second part studies the oscillations of heavy and capillary fluids in a container (static, in movement or with a elastic bottom). They propose a new operator approach and a new theory for describing small oscillations in a particular case.

A list of more than 230 bibliographic entries is provided.

This book gives a lucid exposition of the theme but it is not an easy to read oeuvre or to dip into except if the reader is a researcher in fluid mechanics or an interested mathematician.

*Irving Brown
Brown, Roura and Queiros Consultors S.A.*

MATH INTO LATEX (third edition)

George Grätzer(2000)
Birkhäuser Boston. ISBN 0-8176-4131-9, ISBN 3-7643-4131-9, SPIN 10720602. xxix+584

Math into Latex covers the contents of Latex but is mainly intended for scientific writing of mathematical-type works.

The first part may be considered as a short course for beginners. The second part gives the technical kernel of LATEX: how to type, the use of the environments and mathematical editing. The third part presents the issues of "Document Structure". The rest complete the knowledge for being a senior LATEX user: how to customize, to manage large documents and to use Web information.

The book gives an almost complete account of the system capabilities and provides not only the usual lists of symbols, but how to manage with PS, conversions to specific packages (as AMS-LATEX), a useful "Quick Finder" etc.

The use of an example-based exposition permits to obtain a quicker know-how than with similar books.

The author maintains a Web site which is open for keeping-up-to-date.

This book will be very helpful for those involved with scientific writing but very specially for mathematicians.

*Gemayqzel Bouza Allende
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MODERN MATHEMATICAL MANAGEMENT AND STATISTICAL, SCIENCES, THE INDEX TO THE 20TH CENTURY, PROLOGUE TO THE 21st

J. O. Koo (Editor)
American Sciences Press Inc., Columbus. ISBN 0-935950-46X

This volume is the 42nd of the American Series in Mathematical and <Management Sciences. It presents the indexing organized alphabetically by author and tittle.

If you want to have in your library an Encyclopedia in Management and Statistical Science recommend it to your librarian.

*S. Panov
Quality Control Advisors Inc.*

THE LAPLACE DISTRIBUTION AND GENERALIZATIONS. A REVISIT WITH APPLICATION TO COMMUNICATION, ECONOMICS, ENGINEERING AND FINANCE

Samuel Kotz, Tomasz J. Kozubowski & Krzysztof Podgórski (2001)

Birkhäuser, Boston-Basel-Berlin

ISBN 0-8176-4166-1 ISBN 3-7643-4166-1 SPIN 10754106

xviii-349

The subject of Laplace distribution goes back to the XVIII Century. The first law was presented in 1774 (the usual Laplacian) , and the second Laplace's law in 1778 (the Gaussian). The touchstone of the discussion of the nature of the two laws in applications, as yielded from a phenomena, is Wilson's paper (1923, J. of the American Stat. Ass. pages 841-52). This is the contain of chapter 1. It is sufficient for recommending the lecture of the oeuvre. The book gives an almost complete account on Laplace distribution: properties, representations , characterizations, moments, distribution of its order statistics , inferences for its parameters. It deals with the symmetric and the unsymmetrical cases, Part Y, and with the multivariate problems (Part II). Y felt disappointed with the treatment of the regression which lacks of the completeness of the rest of the problems. In any case Y enjoyed the discussion of the regression models fitting using Least Squares. the authors should be rewarded for filling this usual gap in the treatment of Least Squares in text books. These two parts are highly mathematical and provides proofs of a set of interesting theorems.

Part III is devoted to the discussion of practical problems (Applications) where the Laplace distribution is the correct probabilistic model to be used. Among the presented problems are: encoding-decoding signals, fracture problems, unreported data, option pricing, currency exchange rates, steam generation inspection, demand during lead time low dose responses, sizes of sand particles etc.

420 references are given . I found this book to be useful and is well written I do recommend it as a reference book for specialists involved with probabilistic models.

*C.Bouza
Universidad de La Habana*

REDES NEURONALES ARTIFICIALES. FUNDAMENTOS, MODELOS Y APLICACIONES

José R. Hilera, Víctor J. Martínez (1995)

RA-MA Editorial, Madrid. ISBN 84-7897-155-6

xi+390

Este es un libro que será de utilidad para ingenieros, informáticos y otros profesionistas relacionados con la inteligencia artificial. Las Redes Neuronales son introducidas en este libro a partir de un estudio amplio de los modelos más utilizados actualmente. Estos son analizados con detenimiento y se describe como los modelos actúan y como se desarrolla el aprendizaje a través de ellos. Consta de 9 capítulos. El primero hace una introducción al tema. Los capítulos 2 y 3 son dedicados a establecer la teoría básica donde describe la relación existente entre el modelo biológico y el modelo informático de la neurona, que sustenta el artificio de simulación, y a discutir la topología y los mecanismos de aprendizaje. Algunos de los modelos clásicos son presentados en él. El Capitulo 4 es dedicado al estudio de las redes con conexiones hacia adelante [Forward] como ADALINE, MADALINE y Backpropagation. El quinto presenta el famoso modelo de Hopfield y el 7 el de Kohonen. En el capítulo 6 se presenta el modelo de Resonancia Adaptativa donde se destaca no solo aspectos de su funcionamiento sino también sus limitaciones en la práctica. Los otros dos capítulos son dedicados a establecer el estado actual de los resultados en Redes estocástica y borrosa [Fuzzy].

Una extensa bibliografía es listada al final del libro.

Alain Bosco

STATISTICS IN GENETICS AND THE ENVIROMENTAL SCIENCES

Luisa Turrin Fernholz, Stephan Morgenthaler y Werner Stahel [Editores].
2000, Serie Trends in Mathematics, Biskhauser, Boston
ISBN 3-7643-6575-7 xiv+183

El libro en cuestión contiene los Proceedings de el Taller Estadística y las Ciencias [Statistics and the Sciences] que se desarrolló en el Centro Stefano Franscini en Ascona, Suiza en el periodo 23-28 de Mayo de 1999. El objetivo del taller era establecer el papel de la estadística ante nuevos problemas. Las contribuciones fueron hechas por 25 de los 43 participantes. Son notables las contribuciones relacionadas con la genética [K.E. Basford y D. Amaratunga-C. Field] y con el estudio del medio ambiente [J.Staehelin-W.A. Stahel y D.R. Brillinger] por plantearse un campo de trabajo que es potencialmente importante para el desarrollo de nueva teoría estadísticas. U. Gather *et al.*, M.Hubdert-P.Rouseeuw-S.van Aelst y J. Adrover *et al.* trataron problemas de la regresión desde posiciones poco convencionales [inversa, en profundidad, (Depth Regression) y τ -estimación) y hacen reflexionar sobre la utilidad de tales métodos en esta fascinante área. Diferentes problemas abiertos y soluciones se proponen y no son sino un reto al resto de los matemáticos-estadísticos pues ninguno da una respuesta conclusiva.

Pedro Albuquerque
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INFINITE DIMENSIONAL KÄHLER MANIFOLDS [2001]

Alan Huckleberry and Tilmann Wurzbacher (Editors)
DMV Seminar, Band 31. Birkhäuser Verlag
ISBN 3-7643-6602 xii+375 pages.

Infinite Dimensional Kähler Manifolds is the name of a seminar conducted in November 1995 at the Mathematisches Forschungsinstitut Oberwolfach. Among the supporters was the Deutsche Mathematiker-Vereinigung (DMV). The first chapter can be considered as a good introductory course in the theme (A. Huckleberry). The second one presents extensions of differential calculus following the line of the work of Milnor, see Proceedings of the Summer School on Quantum Gravity, Les Houches, 1983. K. H. Neeb is the author of the third chapter where he describes the theory of irreducible unitary positive energy without using embeddings but the geometry of holomorphic sections of line manifolds over a complex homogeneous space [Kähler manifolds]. Chapter 4 is an exposition of the representation of the Virasoro Algebra and related results. It is based on the method developed by A.A. Kirilov [see Functional Analysis and Applications, volumes 15 and 21]. Its author, V.Y. Ovsienko, gives a complete account of the relations of a certain kind of an infinite dimensional action [coadjoint action] with different concepts as the derivative of Schwarz, Sturm-Liouville periodic operators etc. S. Paycha produced the following chapter. She reviews renormalized limits and different renormalization and regularization procedures. They are used in the establishment of the infinite dimensional characteristics of minimal orbits and determinant bundles. The described constructions are applied to the study of the action of the diffeomorphism group of a closed oriented 2-dimensional manifolds on the weakly Hermitian manifold of metrics of constant curvature equal to -1. The last chapter gives a detailed description of the Grassmannian of a polarised Hilbert space. Together with the exposition T. Wurzbacher gives several remarks on related problems.

The book is of interest for mathematicians and physicists because of the importance of Infinite Dimensional Manifolds in algebra and Lie groups which are present in many subjects of Mathematics and Physics

Jeanette Scheneweiss
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COMPLEXITY AND REAL COMPUTATION

Lenore Blum, Felipe Cucker, Michael Shub and Steve Smale [1998]
Springer Verlag, Berlin
ISBN 0-387-98281 xvi+453

A look to the title suggests that it should be of interest for a wide audience. That is true, but the need of special mathematical skills reduce seriously the size of it. The book a theoretical frame, for dealing with some basic mathematical problems which permeates Computer Science, is developed. The authors are very well known theorists. The theory of complexity appears in modern computation as a real touchstone. The book presents the main results in NP-Completeness and its generalization to numerical fields is developed. The numerical problems are treated using a geometric approach. This themes constitute the first two parts of the book. The last part develops the study of important classes of Computer Science problems . The first part (Basic Development) is composed by 7 chapters, the second (Some Geometry of Numerical Algorithms) and the third (Complexity classes over the reals) by 9 each one.

50 figures are used with illustrating purposes and they give a usefule insight on the meaning of some theoretical results.

A large set of references is provided. The preface was written by one of the most important contributor to NP-Complexity: Richard M. Karp.

*Jeanette Scheneweiss
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MANUAL DE DISTRIBUCION BINOMIAL PARA CIENTIFICOS E INGENIEROS

Elart Collani y Klaus Dräger (2001)
Birkhäuser , Boston. xvi+358
ISBN 0-8176-4129-7 ISBN 3-7643-4129-7 SPIN 10723723

Esta obra debe estar en la biblioteca de todos aquellos que en su trabajo acuden a modelar datos cualitativos. Este no solo provee de nuevas tablas útiles para hacer análisis en pruebas binomiales sino que discute a profundidad los modelos en sí y aspectos de la filosofía de ellos.

Se compone de cinco partes. La primera discute aspectos básicos entre los que se incluyen aspectos filosóficos de lo estocástico y de cómo los modelos probabilísticos lo modelan y qué papel juega la estimación en el vínculo con problemas decisionales prácticos. La segunda parte se dedica a aspectos más instrumentales: medición-predicción y principio de exclusión-decisión. En la tercera se da la instrucción para usar las tablas editadas así como el CD-Rom que se ajunta, que las contiene. La cuarta presenta algunas aplicaciones y la quinta las 116 páginas de tablas. Es de notar que el uso de estas junto con los procedimientos recomendados porpendan a un incremento en las presiones de los estimados y la potencia de las pruebas.

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