

# Analyse numérique

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three-dimensional animal aggregations from a variety of disciplines, from physics to mathematics to biology. The first section of the book is devoted to the various methods used to collect three-dimensional data over time. The second section focuses on analytical methods used to quantify pattern, group kinetics, and inter-individual interactions within the group. The section on behavioral ecology and evolution deals with the functions of aggregative behavior from the point of view of an inherently selfish individual member. The final section presents an alternative to the empirical study of animal aggregation by the use of models.

Alvin C. RENCHER. — **Multivariate statistical inference and applications.** — Wiley series in probability and statistics. Texts and reference section. — Un vol. relié, 16×24, de xx, 559 p. + 1 disquette. — ISBN 0-471-57151-2. — Prix: £60.00. — John Wiley & Sons, New York, 1998.

This text is a user-friendly introduction to basic multivariate analysis theory and practice for statistics with little or no background in theoretical statistics. Among the many special features are: Clear, step-by-step explanations of all key concepts and procedures along with original, easy-to-follow proofs, numerous problems, examples and tables of distributions, many real-world data sets drawn from a wide range of disciplines, reviews of univariate procedures that give rise to multivariate techniques, an extensive survey of the world literature on multivariate analysis, an in-depth review of matrix theory, a disk including all the data sets and SAS command files for all examples and numerical problems found in the book.

## *Analyse numérique*

M.D. BUHMANN, A. ISERLES, (Editors). — **Approximation theory and optimization: tributes to M.J.D. Powell.** — Un vol. relié, 15,5×23,5, de xiii, 220 p. — ISBN 0-521-58190-7. — Prix: £35.00. — Cambridge University Press, Cambridge, 1997.

This volume is derived from invited talks given at a meeting celebrating the sixtieth birthday of Professor Powell and, reflecting his own achievements, focuses on innovative work in optimization and in approximation theory. The individual papers have been written by leading authorities in their subjects and are a mix of expository articles and surveys of new work. They have all been reviewed and edited to form a coherent volume that represents the state of the art in an important discipline within mathematics, with highly relevant applications throughout science and engineering.

Werner HAUSSMANN, Kurt JETTER, Manfred REIMER, (Editors). — **Multivariate approximation: recent trends and results.** — Proceedings of the 2<sup>nd</sup> International Conference on Multivariate Approximation Theory held at Witten-Bommerholz, Germany, September 29-October 4, 1996. — Mathematical research, vol. 101. — Un vol. relié, 18×24, de 320 p. — ISBN 3-05-501770-6. — Prix: DM 138.00. — Akademie Verlag, Berlin, Wiley-VCH, Weinheim, 1997.

This is the presentation of the main results of the 2<sup>nd</sup> International Conference on Multivariate Approximation. There are contributions to the following topics: interpolation and hyperinterpolation on the sphere, quadrature, discrepancy and spherical designs, multivariate convex spline interpolation, triangular finite element spaces, polar form of splines, refinable spline pairs, local box dimension of fractal functions, symbolic treatment of algebraic systems, harmonic approximation and boundary behaviour... synthesis and analysis with multivariate wavelets and frames.

Jacquez RAPPAZ, Marco PICASSO. — **Introduction à l'analyse numérique.** — Un vol. broché, 16×24, de x, 256 p. — ISBN 2-88074-363-X. — Prix: SFr. 63.20. — Presses polytechniques et universitaires romandes, Lausanne, 1998.

Cet ouvrage, synthétique et pédagogique, a pour but de présenter les notions mathématiques nécessaires à la maîtrise des méthodes numériques utilisées dans les sciences de l'ingénieur. Les outils de base nécessaires à l'analyse numérique y sont présentés et la résolution numérique des équations aux dérivées partielles relatives aux phénomènes d'ordre physique, chimique ou biologique est abordée. Le tout est illustré de nombreux exemples, figures et exercices.

Eugene E. TYRTYSHNIKOV. — **A brief introduction to numerical analysis.** — Un vol. relié, 16×24, de xii, 202 p. — ISBN 0-8176-3916-0. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1997.

Since matrix analysis underlies numerical methods, emphasis in the book is on methods and algorithms of matrix analysis. Also considered are function approximations, methods of solving nonlinear equations and minimization methods. Alongside classical methods, new results and approaches developed over the last few years are discussed - namely those on spectral distribution theory and design and proof of modern preconditioning strategies for large-scale linear algebra problems.

## ***Mécanique des particules et systèmes***

J.-M. SOURIAU. — **Structure of dynamical systems: a symplectic view of physics.** — Translated by C.H. Cushman-de Vries, translation edited by R.H. Cushman, G.M. Tuynman. — Progress in mathematics, vol. 149. — Un vol. relié, 16×24, de xxxiv, 406 p. — ISBN 0-8176-3695-1. — Prix: SFr. 158.00. — Birkhäuser, Boston, 1997.

The aim of this book is to treat all three basic theories of physics namely, classical mechanics, statistical mechanics, and quantum mechanics from the same perspective, that of symplectic geometry, thus showing the unifying power of the symplectic geometric approach. In the last chapter of this book the author presents his theory of geometric quantization. Highlights of this chapter are the derivation of the various wave equations and the construction of the Fock space.

## ***Mécanique des solides, élasticité et plasticité***

Javier BONET, Richard D. WOOD. — **Nonlinear continuum mechanics for finite element analysis.** — Un vol. relié, 19×26, de xvii, 248 p. — ISBN 0-521-57272-X. — Prix: £32.50. — Cambridge University Press, Cambridge, 1997.

After a gentle introduction and a chapter on mathematical preliminaries, kinematics, stress, and equilibrium are considered. Hyperelasticity for compressible and incompressible materials includes descriptions in principal directions, and a short appendix extends the kinematics to cater for elastoplastic deformation. Linearization of the equilibrium equations naturally leads on to finite element discretization, equation solution and computer implementation. The majority of chapters include worked examples and exercises. In addition the book provides user instructions, program description, and examples for the FLAGSHYP computer implementation for which the source code is available free on the Internet.