

# Analyse numérique

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to illuminate several topics. CorWinBUGS is provided for a number of computational examples and simulations.

## *Analyse numérique*

Elaine COHEN, Richard F. RIESENFELD, Gershon ELBER. — **Geometric modeling with splines: an introduction.** — Un vol. relié, 16×24, de XXII, 616 p. — ISBN 1-56881-137-3. — Prix: US\$59.00. — A.K. Peters, Natick, Mass., 2001.

Written by researchers who have helped found and shape the field, this book is a definitive introduction to geometric modeling. The authors present a broad base of fundamentally important techniques for curve and surface representations in computer-aided modeling with focus on how the techniques can be used in design. This book offers a thorough study of the use of splines in general, and B-splines in particular, applied to the domain of geometric modeling. It offers an in-depth look at topics such as knot insertion, degree raising, multi-resolution decomposition and editing, and trivariate and multivariate functions. Appropriate for readers with a moderate degree of mathematical maturity, this book is suitable as an undergraduate or graduate text, and particularly as a comprehensive resource for self-study.

Ronald A. DEVORE, Arieh ISERLES, Endre SÜLI, (Editors). — London Mathematical Society lecture note series, vol. 284. — **Foundations of computational mathematics.** — Un vol. broché, 15,5×23, de VIII, 400 p. — ISBN 0-521-00349-0. — Prix: £34.95. — Cambridge University Press, Cambridge, 2001.

This book presents thirteen papers written by plenary speakers from the 1999 conference, all of whom are the foremost figures in their respective fields. Topics covered include complexity theory, approximation theory, optimisation, computational geometry, stochastic systems and the computation of partial differential equations. The wide range of topics covered illustrates the diversity of contemporary computational mathematics and the intricate web of its interaction with pure mathematics and application area. This book will be of interest to researchers and graduate students in all areas of mathematics involving numerical and symbolic computations.

N. DYN, D. LEVIATAN, D. LEVIN, A. PINKUS, (Editors). — **Multivariate approximation and applications.** — Un vol. relié, 15,5×23,5, de X, 286 p. — ISBN 0-521-80023-4. — Prix: £45.00. — Cambridge University Press, Cambridge, 2001.

Multivariate approximation theory is today an increasingly active research area. It encompasses a wide range of tools for multivariate approximation such as multi-dimensional splines and finite elements, shift-invariant spaces and radial-basis functions. The multivariate setting is important since it models many real-world problems. This advanced introduction to multivariate approximation and related topics consists of nine articles written by leading experts surveying many of the new ideas and their applications. Each article introduces a particular topic, takes the reader to the forefront of research and ends with a comprehensive bibliography.

Tian-Xiao HE. — **Dimensionality reducing expansion of multivariate integration.** — Un vol. relié, 16,5×24, de IX, 225 p. — ISBN 0-8176-4170-X. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2001.

Multivariate integration has been a fundamental subject in mathematics, with broad connections to a number of areas: numerical integration, partial differential equations and Green's function, harmonic analysis, numerical analysis and approximation theory. In this work the exposition focuses primarily on a powerful tool which has become especially important in our computerized age, namely, dimensionality reducing expansion (DRE). The method of dimensionality reducing expansion (DRE) is a technique for changing a higher dimensional integration to a lower dimensional one with or without remainder.

Heinz-Otto KREISS, Hedwig Ulmer BUSENHART. — **Time-dependent partial differential equations and their numerical solution.** — Lectures in mathematics ETH Zürich. — Un vol. broché, 17×24, de VI, 82 p. — ISBN 3-7643-6125-5. — Prix: SFr. 34.00. — Birkhäuser, Basel, 2001.

In these notes the authors study time-dependent partial differential equations and their numerical solution. The analytic and the numerical theory are developed in parallel. For example, they discuss well-posed linear and nonlinear problems, linear and nonlinear stability of difference approximations and error estimates. Special emphasis is given to boundary conditions and their discretization. A rather general theory of admissible boundary conditions based on energy estimates or Laplace transform techniques is developed. These results are fundamental for the mathematical and numerical treatment of large classes of applications like Newtonian and non-Newtonian flows, two-phase flows and geophysical problems.

Arnold NEUMAIER. — **Introduction to numerical analysis.** — Un vol. broché, 15×23, de VIII, 356 p. — ISBN 0-521-33610-4. — Prix: £23.95. — Cambridge University Press, Cambridge, 2001.

This textbook provides an introduction to the justification and development of constructive methods that provide sufficiently accurate approximations to the solution of numerical problems, and the analysis of the influence that errors in data, finite-precision calculations, and approximation formulas have on results, problem formulation, and the choice of method. It also serves as an introduction to scientific programming MATLAB, including many simple and difficult, theoretical and computational exercises. A unique feature of this book is the consequent development of interval analysis as a tool for rigorous computation and computer-assisted proofs, along with the traditional material.

Victor Y. PAN. — **Structured matrices and polynomials: unified superfast algorithms.** — Un vol. relié, 16,5×24, de XXIV, 278 p. — ISBN 0-8176-4240-4. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2001.

Structured matrices serve as a natural bridge between the areas of algebraic computations with polynomials and numerical matrix computations, allowing cross-fertilization of both fields. This book covers most fundamental numerical and algebraic computations with Toeplitz, Hankel, Vandermonde, Cauchy and other popular structured matrices. Throughout the computations, the matrices are represented by their compressed images, called displacements, enabling both a unified treatment of various matrix structures and dramatic saving of computer time and memory. The resulting superfast algorithms allow further parallel acceleration using FFT and fast sine and cosine transforms. Included are specific applications to other fields, in particular, superfast solutions to: various fundamental problems of computer algebra; the tangential Nevanlinna–Pick and matrix Nehari problems.

## ***Informatique***

**Angewandte Informatik.** — Duden – Basiswissen Schule. — Un vol. relié, 15,5×21,5, de 276 p. + 1 CD-ROM. — ISBN 3-411-71511-1. — Prix: DM 39.90. — PAETEC Verlag für Bildungsmedien, Berlin et Dudenverlag – Bibliographisches Institut & F.A. Brockhaus, Mannheim, 2001.

Das Buch *Angewandte Informatik* ist absolut praxistauglich. Es vermittelt Fachausdrücke und Wissen, wie es im täglichen Umgang mit dem Computer gebraucht wird. Animationen auf der beiliegenden CD-ROM veranschaulichen Arbeitsschritte am PC auf eine frappierend einleuchtende Art. — *Inhalt:* Themen und Inhalte aus dem Sachbereich der informations-