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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-

technischen Grundbildung aller Schulformen. Das Anwenderwissen über Betriebssysteme, Textverarbeitung, Tabellenkalkulation, Datenbanken, Grafikprogramme und Internet. — Das Buch zum schnellen und gezielten Nachschlagen und Wiederholen in der Schule, bei den Hausaufgaben sowie bei der Vorbereitung auf Kontrollarbeiten und Prüfungen. — Die CD-ROM als Grundlage für die Arbeit an Referaten, Belegarbeiten, Projekten und besonderen Problemstellungen. Mit ausführlichen und interaktiven Elementen zu vielen Hundert Themen. — Lauffähig mit allen gängigen Browsern für Windows, Linux- und Macintosh- Computer, Direktzugriff auf www.schuelerlexikon.de

Richard H. ENNS, George C. MCGUIRE. — **Nonlinear physics with *Mathematica* for scientists and engineers.** — Un vol. relié, 18×26, de XIII, 691 p. + 1 CD-ROM. — ISBN 0-8176-4223-4. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2001.

In this text extensive use is made of the *Mathematica* computer algebra system. No prior knowledge of *Mathematica* or programming is assumed. The authors have included a CD-ROM that contains over 130 annotated *Mathematica* files. These files may be used to solve and explore the text's 400 problems. This book includes 33 experimental activities that are designed to deepen and broaden the reader's understanding of nonlinear physics. These activities are correlated with the theoretical framework of the text.

Jürgen GERHARD, Walter OEVEL, Frank POSTEL, Stefan WEHMEIER. — **Introduction à MuPAD: une introduction indépendante de la version et de la plate-forme.** — SciFace, Scientific interfaces. — Un vol. broché, 15,5×23,5, de XIII, 361 p. — ISBN 3-540-41453-3. — Prix: SFr. 52.00. — Springer, Berlin, 2001.

Ce didacticiel explique les bases de l'utilisation du programme MuPAD et donne un aperçu de la puissance du système. Les principales caractéristiques et les outils de base en sont présentés au cours d'étapes simples. Beaucoup d'exemples et d'exercices illustrent comment utiliser les fonctions, les méthodes graphiques, et le langage de programmation du système. Ce didacticiel se rapporte aux versions 1.4, 2.0 ou ultérieures de MuPAD. Pour permettre aux lecteurs de ce livre de suivre les changements pouvant survenir par la suite, des additifs et des mises à jour de ce didacticiel peuvent être téléchargés à partir de la page web suivante: http://www.sciface.com/support/springer.

Bakhadyr KHOUSSAINOV, Anil NERODE. — **Automata theory and its applications.** — Progress in computer science and applied logic, vol. 21. — Un vol. relié, 16,5×24, de XIV, 430 p. — ISBN 0-8176-4207-2. — Prix: SFr. 138.00. — Birkhäuser, Boston, 2001.

The book is a uniform treatment of the theory of finite state machines on finite and infinite strings and trees. Many books deal with automata on finite strings, but there are very few expositions that prove the fundamental results of automata on infinite strings and trees. These results have important applications to modeling parallel computation and concurrency, the specification and verification of sequential and concurrent programs, databases, operating systems, computational complexity, and decision methods in logic and algebra. Thus, this textbook fills an important gap in the literature by exposing early fundamental results in automata theory and its applications.

Herwig MAYR. — **Virtual automation: design, modeling, visualization, simulation.** — Mathematical methods in technology, vol. 1. — Un vol. relié, 18×26, de XXII, 275 p. — ISBN 0-8247-0736-2. — Prix: $85.00. — Marcel Dekker, New York, 2002.

This textbook presents concepts underlying virtual automation, highlights geometric and kinematic design and modeling, and traces the gradual evolution from graphic simulation

systems to virtual environments while emphasizing fundamentals that have remained unchanged throughout the transition. It surveys algorithmic manufacturing verification when determining collisions in manufacturing cell... illustrates hidden line and surface removal, rendering methods, and texturing to create realistic images... stresses the importance of time-efficient algorithms that can be visualized on modern, window-oriented raster-graphic displays... presents mathematical problems and solutions of solid modeling... considers trends in factory automation and computer-integrated manufacturing... and more.

Bruno PETAZZONI. — **Seize problèmes d'informatique.** — Avec corrigés détaillés et programmes en Caml. — Scopos, vol. 8. — Un vol. broché, 15,5×23,5, de XV, 226 p. — ISBN 3-540-67387-3. — Prix: DM 64.00. — Springer, Berlin, 2001.

Cet ouvrage rassemble 16 problèmes corrigés d'informatique. Chaque problème est précédé d'une rapide présentation, et le corrigé est complet: chaque question y trouve une réponse. Des notes historiques et bibliographiques apportent des précisions complémentaires, et donnent au lecteur curieux des pistes vers d'autres sources d'information. Les réponses aux questions de programmation sont données dans le langage de programmation fonctionnelle Caml, à la fois concis et élégant. Ce recueil est destiné aux étudiants qui suivent l'enseignement optionnel d'informatique en filière MPSI/MP (classes préparatoires aux grandes écoles d'ingénieurs). Il intéressera également les étudiants en licence ou en maîtrise d'informatique.

Mécanique des particules et systèmes

Stephanie Frank SINGER. — **Symmetry in mechanics: a gentle, modern introduction.** — Un vol. broché, 15,5×23,5, de XII, 193 p. — ISBN 0-8176-4145-9. — Prix: SFr. 58.00. — Birkhäuser, Boston, 2001.

The monograph was written with two goals in mind: to chip away at the language barrier between physicists and mathematicians and to link the abstract constructions of symplectic mechanics to concrete, explicitly calculated examples. The context is the two-body problem, i.e., the derivation of Kepler's laws of planetary motion from Newton's laws of gravitation. After a straightforward and elementary presentation of this derivation in the language of vector calculus, subsequent chapters slowly and carefully introduce symplectic manifolds, Hamiltonian flows, Lie group actions, Lie algebras, momentum maps and symplectic reduction, with many examples, illustrations and exercises. The work ends with the derivation it started with, but in the more sophisticated language of symplectic and differential geometry.

Mécanique des solides, élasticité et plasticité

Y.B. FU, R.W. OGDEN, (Editors). — **Nonlinear elasticity: theory and applications.** — London Mathematical Society lecture note series, vol. 283. — Un vol. broché, 15,5×23, de XI, 525 p. — ISBN 0-521-79695-4. — Prix: £34.95. — Cambridge University Press, Cambridge, 2001.

Nonlinear elasticity is concerned with nonlinear effects associated with deformations of elastic bodies subjected to external forces or temperature variations. It has important applications in, for example, the aerospace and rubber industries. This book provides an up-to-date and concise account of the fundamentals of the theory of nonlinear elasticity and a comprehensive review of several major current research directions in this important field. It combines the characteristics of coherence and detail found in standard treatises with the strength and freshness of research articles. The emphasis is placed firmly on coverage of modern topics and recent developments rather than on the very theoretical approach often found.