Mécanique des solides, élasticité et plasticité

Guy CAPLAT. — **Modélisation cognitive et résolution de problèmes.** — Informatique INSA Lyon 2e cycle. — Collection des sciences appliquées de l'INSA de Lyon. — Un vol. broché, 16×24, de XV, 199 p. — ISBN 2-88074-495-4. — Prix: SFr. 46.00. — Presses polytechniques et universitaires romandes, Lausanne, 2002.

L'automatisation totale ou partielle d'un processus de résolution de problèmes nécessite une analyse, une modélisation puis une traduction en un programme informatique des connaissances mobilisées par l'être humain lors de cette résolution. En désignant les objets qui nous entourent, en les organisant en structures signifiantes, la connaissance possède un rôle de médiation entre une réalité perçue et des interprétations rationnelles. Mais quelles sont la nature et le rôle des connaissances mobilisées par l'humain dans le cadre d'une activité de résolution de problèmes? Dans quelle mesure ces connaissances sont-elles modélisables? Quelle méthodologie adopter pour traduire des connaissances humaines en programmes informatiques? C'est à ces questions fondamentales que répond cette excellente introduction à la modélisation cognitive.

William H. PRESS, Saul A. TEUKOLSKY, William T. VETTERLING, Brian P. FLANNERY. — **Numerical recipes in C++: the art of scientific computing**. — Second edition. — Un vol. relié, de 18,5×26, de XXVIII, 1002 p. — ISBN 0-521-75033-4. — Prix: £45.00. — Cambridge University Press, Cambridge, 2002.

Now the acclaimed second edition of *Numerical Recipes: the Art of Scientific Computing* is available in the C++ object-oriented programming language. Including and updating the full mathematical and explanatory contents of *Numerical Recipes in C*, this new version incorporates completely new C++ versions of the more than 300 routines that are widely recognized as the most accessible and practical basis for scientific computing. In a self contained manner this text proceeds from mathematical and theoretical considerations to actual practical computer routines. Highlights include linear algebra, interpolation, special functions, random numbers, nonlinear sets of equations, optimization, eigensystems, Fourier methods and wavelets, statistical tests, ODEs and PDEs, integral equations and inverse theory.

James A. STORER. — **An introduction to data structures and algorithms.** — Un vol. relié, 19×26, de XVII, 599 p. — ISBN 0-8176-4253-6. — Prix: SFr. 112.00. — Birkhäuser, Boston, 2002.

Data structures and algorithms are presented at the college level in a way that is unique in content and presentation from current available texts. A highly accessible format presents algorithms with one page displays that will appeal to both students and teachers of computer science. The thirteen chapters systematically and comprehensively cover models of computation, lists, induction and recursion, trees, algorithms design, hashing, heaps, balanced trees, sets over a small universe, discrete Fourier transform, strings, graphs, parallel models of computation.

Mécanique des solides, élasticité et plasticité

John G. HARRIS. — **Linear elastic waves.** — Cambridge texts in applied mathematics. — Un vol. broché, 16×23, de XV, 162 p. — ISBN 0-521-64383-X. — Prix: £17.95. — Cambridge University Press, Cambridge, 2001.

Wave propagation and scattering are among the most fundamental processes that we use to comprehend the world around us. While these processes are often very complex, one way to begin to understand them is to study wave propagation in the linear approximation. This is a book describing such propagation using, as a context, the equations of elasticity. Two unifying themes are used. The first is that an understanding of plane wave interactions is fundamental to understanding more complex wave interactions. The second is that waves are best understood in an asymptotic approximation where they are free of the complications of their excitation and are

governed primarily by their propagation environments. The topics covered include reflection, refraction, the propagation of interfacial waves, integral representations, radiation and diffraction, and propagation in closed and open waveguides.

Mécanique des fluides, acoustique

B.E. LAUNDER, N.D. SANDHAM, (Editors). — **Closure strategies for turbulent and transitional flows.** — Un vol. relié, 18,5×25, de XIII, 754 p. — ISBN 0-521-79208-8. — Prix: £85.00. — Cambridge University Press, Cambridge, 2002.

Turbulence modelling is a critically important area in any industry dealing with fluid flow, having many implications for computational fluid dynamics (CFD) codes. The work, which has grown out of a two-week instructional conference at the Newton Institute in Cambridge, is designed to serve as a graduate-level textbook and, equally, as a reference book for research workers in industry or academia. It is structured in three parts: physical and numerical techniques, flow types and processes, future directions.

Thermodynamique classique, propagation de la chaleur

Glenn R. FULFORD, Philip BROADBRIDGE. — **Industrial mathematics: case studies in the diffusion of heat and matter.** — Australian Mathematical Society lecture series, vol. 16. — Un vol. broche, 15×23, de XII, 202 p. — ISBN 0-521-00181-1. — Prix: £17.95 (relié: £47.50). — Cambridge University Press, Cambridge, 2001.

The focus in this text is on mathematical modelling stimulated by contemporary industrial problems involving heat conduction and mass diffusion. These include continuous metal casting, laser drilling, spontaneous combustion of industrial waste, water filtration and crop irrigation. The industrial problems prove to be an excellent setting for the introduction and reinforcement of modelling skills, equation solving techniques, qualitative understanding of partial differential equations and their dynamical properties. Mathematical topics include setting up partial differential equations and boundary conditions, dimensional analysis, scaling, perturbation expansions, boundary values problems, Fourier series, symmetry reductions, Stefan problems and bifurcations.

Mécanique quantique

Victor KAC, Pokman CHEUNG. — **Quantum calculus.** — Universitext. — Un vol. broché, 15,5×23,5, de IX, 112 p. — ISBN 0-387-95341-8. — Prix: € 34.95. — Springer, New York, 2002.

Simply put, quantum calculus is ordinary calculus without taking limits. This undergraduate text develops two types of quantum calculi, the q-calculus and the h-calculus. As this book develops quantum calculus along the lines of traditional calculus, the reader discovers, with a remarkable inevitability, many important notions and results of classical mathematics. This book is based on lectures and seminars given by Professor Kac over the last few years at MIT.

Astronomie et astrophysique

Mikhail Ya. MAROV, Aleksander V. KOLESNICHENKO. — **Mechanics of turbulence of multicomponent gases.** — Astrophysics and space science library, vol. 269. — Un vol. relié, 16,5×24,5, de XIII, 375 p. — ISBN 1-4020-0103-7. — Prix: € 144.00. — Kluwer Academic Publishers, Dordrecht, 2002.

This book develops a new mathematical approach for modeling multicomponent gas turbulence that adequately describes the combined processes of dynamics and heat and mass