

# Astronomie et astrophysique

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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 multi-component 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

transfer when chemical kinetics and turbulent mixing are equally important. The developed models include the evolutionary transfer equations for the single-point second correlation moments of turbulent fluctuations of thermohydrodynamical parameters. As compared to previously published books on the problem of turbulence, this book deals, for the first time, with the complicated models of reacting gas mixtures. It is intended for graduate and postgraduate students in the fields of fluid gas dynamics, astrophysics, space physics, planetary sciences, and aeronomy, and especially for those dealing with computer modelling of the processes in such natural media. The book may also be of interest to specialists in the relevant fields of ecology, engineering, and material processing.

### ***Économie, recherche opérationnelle, jeux***

Maïtine BERGOUNIOUX. — **Optimisation et contrôle des systèmes linéaires: cours et exercices avec solutions.** — Sciences sup, cours 2<sup>e</sup> cycle. — Un vol. broché, 17×24, de IX, 260 p. — ISBN 2-10-005626-3. — Prix: € 25.90. — Dunod, Paris, distribution Vivendi Universal, Fribourg, Suisse, 2001.

Cet ouvrage présente une introduction à la théorie du contrôle optimal des équations différentielles ordinaires ainsi que les fondements de l'optimisation en dimension finie et les algorithmes de base. Une première partie évoque l'optimisation en dimension finie en abordant les notions de convexité, de minimisation sans contraintes et avec contraintes et les principales méthodes de résolution numérique. En seconde partie, les résultats obtenus sont appliqués au contrôle optimal des systèmes différentiels linéaires; quelques notions de calcul différentiel y sont également rappelées.

Gerard SIERKSMA. — **Linear and integer programming: theory and practice.** — Second edition. — Monographs and textbooks in pure and applied mathematics, vol. 245. — Un vol. relié, 19×26, de XIV, 633 p. + 1 disquette. — ISBN 0-8247-0673-0. — Prix: US\$ 175.00. — New York, Marcel Dekker, 2002.

Thoroughly reorganized throughout to provide enhanced logical and clear presentation of the topics discussed, this second edition of *Linear and Integer Programming* offers theory and solutions for in-depth analyses... covers duality, degeneracy, and multiplicity from a geometrical viewpoint... considers branch-and-bound, simplex, revised simplex, and network simplex techniques... examines sensitivity analysis... details the Gilmore–Gomory and Bender decomposition methods... highlights the interior path version of Karmarkar's method... examines mixed-integer programming and the theory of logical variables... demonstrates the theory of totally unimodular and network matrices... outlines linear algebra, convexity, and graph theory... displays flow diagrams for composing courses... contains software for the interior path method and more.

### ***Biologie et sciences du comportement***

Martin BENISTON, (Editor). — **Climatic change: implications for the hydrological cycle and for water management.** — Advances in global change research, vol. 10. — Un vol. relié, 16,5×24,5, de XX, 501 p. — ISBN 1-4020-0444-3. — Prix: € 140.00. — Kluwer Academic Publishers, Dordrecht, 2002.

The material presented in this book covers such diverse areas as shifts in precipitation patterns in a changing global climate, the implications of floods or drought, and considerations of managing water resources stressed by poor management practices, overexploitation, and climatic change. In this sense, bringing together, under one cover, issues that are often otherwise dealt with in a mono-disciplinary manner, i.e. either through the physical sciences or through