

Mécanique des fluides, acoustique

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the book briefly elaborates the need for error-correction capabilities and then traces the theory of quantum error-correcting codes from the earliest examples to an abstract formulation in Hilbert space.

Raymond SÉROUL. — **Programming for mathematicians.** — Universitext. — Un vol. broché, $15,5 \times 23,5$, de xv, 429 p. — ISBN 3-540-66422-X. — Prix: DM 69.00. — Springer, Berlin, 2000.

The aim of this book is to teach mathematics students how to program using their knowledge of mathematics. For this they require only to know how to construct a proof. The entire book's emphasis is on "how to think" when programming. Three methods for constructing an algorithm or a program are used: a) manipulation and enrichment of existing code; b) use of recurrent sequences; c) deferral of code writing, in order to deal with one difficulty at a time. Many theorems are mathematically proved and programmed. The last chapter explains how a compiler works and shows how to compile "by hand" little (but not trivial - even recursive) programs. The book is intended for anyone who thinks mathematically and wants to program and play with mathematics.

Mécanique des solides, élasticité et plasticité

Gérard A. MAUGIN. — **Nonlinear waves in elastic crystals.** — Oxford science publications. — Oxford mathematical monographs. — Un vol. relié, 16×24 , de ix, 314 p. — ISBN 0-19-853484-1. — Prix: £ 70.00. — Oxford University Press, Oxford, 1999.

From the preface: The precise project for this book took shape after the writing of the lecture notes for a course on the "Physical and mathematical models of nonlinear waves in solids" delivered in 1993 at the International Centre for Mechanical Sciences, Udine, Italy... It was neither to be a book on crystallography per se nor a treatise of mathematics. Rather, it was intended to be devoted to applied mathematics exploited in a specific physical field of basic interest to many scientists and engineers. — *Contents:* Different types of crystal. Discrete and continuum descriptions: general introduction. Elasticity and anelasticity: continuous viewpoint. Elasticity and anelasticity: discrete viewpoint. Coupled fields in elasticity. Nonlinear waves in elastic chains. Nonlinear waves in elastic crystals with a microstructure. Nonlinear waves in martensite structures. Nonlinear acoustic surface waves in crystals. Shock waves and phase-transition fronts in thermoelastic crystals.

Mécanique des fluides, acoustique

Albert GYR, Wolfgang KINZELBACH, Arkady TSINOBER, (Editors). — **Fundamental problematic issues in turbulence.** — Trends in mathematics. — Un vol. relié, $17,5 \times 24$, de viii, 480 p. — ISBN 3-7643-6150-6. — Prix: SFr. 198.00. — Birkhäuser, Basel, 1999.

The intention of the book is to highlight the problematic aspects of turbulence. The contributions treat a variety of mathematical, physical and engineering subjects related to turbulence. The topics include mathematical issues, control and related problems, observational aspects, two- and quasi-two-dimensional flows, basic aspects of turbulence modeling, statistical issues and passive scalars. The main questions addressed are the controllability of turbulent flows, possible qualitative differences between pure two-dimensional and real quasi-two-dimensional turbulent flows, common features of two-dimensional and three-dimensional turbulence, etc.

Clifford TRUESDELL, Kumbakonam Ramamani RAJAGOPAL. — **An introduction to the mechanics of fluids.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16×24, de XII, 277 p. — ISBN 0-8176-4014-2. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This new advanced text/reference presents an introduction to many aspects of fluid mechanics, with particular emphasis on the description and response of nonlinear fluids. Results are developed and established with rigor, and the topics span from Euler fluids to fluids that have memory. *Topics and features:* Integrated chapter exercises. — Numerous detailed, worked examples and results. — Visometric flows. — Nonlinear fluids. — Navier-Stokes fluids. — Compressible and incompressible Euler fluids and flows.

Thermodynamique classique, propagation de la chaleur

Vincent GIOVANGIGLI.— **Multicomponent flow modeling.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16×24, de XVI, 321 p. — ISBN 0-8176-4048-7. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1999.

This book provides a complete interdisciplinary overview of multicomponent flow modeling and analysis. The goal of this book is to give a detailed presentation of the governing equations – including the expression of multicomponent transport coefficients – obtained from the kinetic theory of gases. Another goal is to analyze the mathematical properties of the model, more specifically, to investigate thermochemistry properties, the structure of multicomponent transport, and well posedness of the resulting system of partial differential equations. Finally, the book discusses the numerical simulation of reactive flows and presents complex chemistry-flame simulations.

Mécanique quantique

Jean-Noël CHAZALVIEL. — **Coulomb screening by mobile charges: applications to materials science, chemistry, and biology.** — Un vol. relié, 17×24,5, de X, 355 p. — ISBN 0-9176-3950-0. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1999.

This work is the first comprehensive treatment of screening, particularly with respect to out-of-equilibrium systems. It is divided into two parts. The first outlines the principles of screening at equilibrium or near equilibrium, while the second is devoted to the case of strong deviations from equilibrium. A great strength of this text is its unique interdisciplinary exposition, which sometimes leads to an unconventional presentation of classical results. Following the introduction of each major concept, applications to different subject areas are described, and further developed by problems, with solutions provided. The extensive list of references will be useful to both graduate student and researcher.

Sam TREIMAN. — **The odd quantum.** — Un vol. relié, 16,5×24, de VIII, 262 p. — ISBN 0-691-00926-0. — Prix: US\$24.95. — Princeton University Press, Princeton, 1999.

The author begins with an overview of quantum mechanics. He sketches the early development of the field by Einstein, Bohr, Heisenberg, Schrödinger, and others, and he makes clear how the quantum outlook flies in the face of common sense. As he explains, the quantum world is intrinsically probabilistic. For example, a particle is not in general in some particular place at a given instant, nor does it have a definite momentum. Weaving together impeccable and up-to-date science, engaging writing, and a talent for clear explanation honed over Treiman's distinguished career as a physicist and teacher, this book provides a remarkable survey of a field that changed the course of modern scientific and philosophical thought.