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Mécanique des fluides, acoustique

C. FOIAS, O. MANLEY, R. ROSA, R. TEMAM. — **Navier-Stokes equations and turbulence.** — Encyclopedia of mathematics and its applications, vol. 83. — Un vol. relié, 15×24, de XIII, 347 p. — ISBN 0-521-36032-3. — Prix: £60.00. — Cambridge University Press, Cambridge, 2001.

This book aims to bridge the gap between practicing mathematicians and the practitioners of turbulence theory. It presents the mathematical theory of turbulence to engineers and physicists as well as the physical theory of turbulence to mathematicians. The book is the result of many years of research by the authors, who analyse turbulence using Sobolev spaces and functional analysis. In this way the authors have recovered parts of the conventional theory of turbulence, deriving rigorously from the Navier-Stokes equations what had been arrived at earlier by phenomenological arguments. The mathematical technicalities are kept to a minimum within the book, enabling the discussion to be understood by a broad audience.

Thermodynamique classique, propagation de la chaleur

Stephen H. DAVIS. — **Theory of solidification.** — Cambridge monographs on mechanics. — Un vol. relié, 16×23, de XIV, 385 p. — ISBN 0-521-65080-1. — Prix: £50.00. — Cambridge University Press, Cambridge, 2001.

The processes of freezing and melting were present at the beginning of the Earth and continue to affect the natural and industrial worlds. The solidification of a liquid or the melting of a solid involves a complex interplay of many physical effects. This book systematically presents the field of continuum solidification theory based on instability phenomena. An understanding of the physics is developed by using examples of increasing complexity with the object of creating a deep physical insight applicable to more complex problems.

Physique statistique, structure de la matière

Pavel M. BLEHER, Alexander R. ITS, (Editors). — **Random matrix models and their applications.** — Mathematical Sciences Research Institute publications, 40. — Un vol. relié, 16,5×24,5, de X, 438 p. — ISBN 0-521-80209-1. — Prix: £45.00. — Cambridge University Press, Cambridge, 2001.

This volume of surveys and research results, based largely on lectures given at the Spring 1999 MSRI program of the same name, covers broad areas such as topologic and combinatorial aspects of random matrix theory; scaling limits, universalities and phase transitions in matrix models; universalities for random polynomials; and applications to integrable systems. Its stress on the interaction between physics and mathematics will make it a welcome addition to the shelves of graduate students and researchers in both fields, as will its expository emphasis.

Astronomie et astrophysique

Arlie O. PETTERS, Harold LEVINE, Joachim WAMBSGANSS. — **Singularity theory and gravitational lensing.** — Progress in mathematical physics, vol. 21. — Un vol. relié, 19×25, de XXIV, 603 p. — ISBN 3-7643-3668-4. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

This monograph, unique in the literature, is the first to develop a mathematical theory of gravitational lensing. The theory applies to any finite number of deflector planes and highlights the distinctions between single and multiple plane lensing. Introductory material in Parts I and II