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Mécanique des fluides, acoustique

A.M. ELIZAROV, N.B. IL'INSKIY, A.V. POTASHEV. — **Mathematical methods of airfoil design: inverse boundary-value problems of aerohydrodynamics.** — Un vol. relié, 17×25, de 292 p. — ISBN 3-05-501701-3. — Prix: DM 148.00. — Akademie Verlag, Berlin, Wiley-VCH, Weinheim, 1997.

This book presents over thirty years of research from Russia as well as new research of the authors. Principal methods and results for solutions of the inverse boundary value problems of aerohydrodynamics for 2D flows are presented. The essence of the problems consists in finding an airfoil shape (isolated, multicomponent or an element of a cascade) by pressure or velocity distributions given on the contour of the airfoil which provide the required aerodynamic characteristics. Mathematical models of ideal liquid, boundary layer and Chaplygin gas are used. Special attention is paid to mathematical aspects of the theory and to optimization problems.

R.S. JOHNSON. — **A modern introduction to the mathematical theory of water waves.** — Cambridge texts in applied mathematics. — Un vol. broché, 15,5×23, de xiv, 445 p. — ISBN 0-521-59832-X. — Prix: £19.95 (relié: £55.00). — Cambridge University Press, Cambridge, 1997.

Beginning with the introduction of the appropriate equations of fluid mechanics, the opening chapters go on to consider some classical problems in linear and non-linear water-wave theory. This sets the scene for a study of more modern aspects, problems that give rise to soliton-type equations. The book closes with an introduction to the effects of viscosity. All the mathematical developments are presented in the most straightforward manner, with worked examples and simple cases carefully explained.

Pierre-Louis LIONS. — **Mathematical topics in fluid mechanics. vol. 2: Compressible models.** — Oxford lecture series in mathematics and its applications, vol. 10. — Oxford science publication. — Un vol. relié, 16,5×24, de xiv, 348 p. — ISBN 0-19-851488-3. — Prix: £39.50. — Clarendon Press, Oxford, 1998.

The main emphasis in the first volume is on the mathematical analysis of incompressible models. The second volume is an attempt to achieve a mathematical understanding of compressible Navier-Stokes equations. It is probably the first reference covering the issue of global solutions in the large. It includes entirely new material on compactness properties of solutions for the Cauchy problem, the existence and regularity of stationary solutions, and the existence of global weak solutions.

Physique statistique, structure de la matière

Charles M. NEWMAN. — **Topics in disordered systems.** — Lectures in mathematics, ETH Zürich. — Un vol. relié, 17×24, de viii, 88 p. — ISBN 3-7643-5777-0 (Basel), 0-8176-5777-0 (Boston). — Prix: SFr. 28.00. — Birkhäuser Verlag, Basel, 1997.

This lecture notes volume concerns the equilibrium properties of a few carefully chosen examples of disordered Ising models. The two main types of systems considered are disordered ferromagnets and spin glasses. The emphasis is on questions concerning the number of ground states (at zero temperature) or the number of pure Gibbs states (at nonzero temperature). A recurring theme is that these questions are connected to interesting issues concerning percolation and related models of geometric/combinatorial probability.