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Roy JACKSON. — **The dynamics of fluidized particles.** — Cambridge monographs on mechanics. — Un vol. relié, 16 × 23,5, de xii, 339 p. — ISBN 0-521-78122-1. — Prix: £42.50. — Cambridge University Press, Cambridge, 2000.

Recent years have seen major progress in the development of equations to describe the motion of fluid-particle mixtures and their application to a limited range of problems. With rapid advances in numerical methods and computing power we are now presented with new opportunities to use direct integration of these equations in the solution of complex practical problems. In this book the author formulates these equations carefully and fully describes the important existing applications that serve to test their ability to predict salient phenomena. This account will be of value to both novices and established researchers in the field, and also to people interested in applying the equations to practical engineering problems.

Ansgar JÜNGEL. — **Quasi-hydrodynamic semiconductor equations.** — Progress in nonlinear differential equations and their applications, vol. 41. — Un vol. relié, 16 × 24, de x, 293 p. — ISBN 3-7643-6349-5. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

In this book a hierarchy of macroscopic models for semiconductor devices is presented. Three classes of models are studied in detail: isentropic drift-diffusion equations, energy-transport models, and quantum hydrodynamic equations. The derivation of each of the models is shown, including physical discussions. Furthermore, the corresponding mathematical problems are analyzed, using modern techniques for nonlinear partial differential equations. The equations are discretized employing mixed finite-element methods. Also, numerical simulations for modern semiconductor devices are performed, showing the particular features of the models. Modern analytical techniques have been used and further developed, such as positive solution methods, local energy methods for free-boundary problems and entropy methods.

## ***Economie, recherche opérationnelle, jeux***

Claus HILLERMEIER. — **Nonlinear multiobjective optimization: a generalized homotopy approach.** — International series of numerical mathematics, vol. 135. — Un vol. relié, 17 × 24, de 135 p. — ISBN 3-7643-6498-X. — Prix: SFr. 78.00. — Birkhäuser, Basel, 2001.

The present work, after providing a survey of the state of the art in multiobjective optimization, gives new insight into this important mathematical field by consequently taking up the viewpoint of differential geometry. This approach, unprecedented in the literature, very naturally results in a generalized homotopy method for multiobjective optimization which is theoretically well-founded and numerically efficient. The power of the new method is demonstrated by solving two real-life problems of industrial optimization. The book presents recent results obtained by the author.

Mahmut PARLAR. — **Interactive operations research with Maple: methods and models.** — Un vol. relié, 16 × 24, de xiv, 468 p. — ISBN 0-8176-4165-3. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2000.

Detailed is Maple's treatment of some of the mathematical techniques used in OR modeling: e.g., algebra and calculus, ordinary and partial differential equations, linear algebra, transform methods, and probability theory. A number of examples of OR techniques and applications are presented, such as linear and nonlinear programming, dynamic programming, stochastic processes, inventory models, queuing systems, and simulation. Throughout the text Maple statements used in the solutions of problems are clearly explained. At the same time, technical background material is presented in a rigorous mathematical manner to reach the OR novice and

professional. Numerous end-of-chapter exercises, a good bibliography and overall index at the end of the book are also included, as well as Maple worksheets that are easily downloadable from this website or from the author's website at [www.business.mcmaster.ca/msis/profs/parlar](http://www.business.mcmaster.ca/msis/profs/parlar), or from the Birkhäuser site.

## *Systèmes, contrôle optimal*

Goong CHEN, Irena LASIECKA, Jianxin ZHOU, (Editors). — **Control of nonlinear distributed parameter systems.** — Lecture notes in pure and applied mathematics, vol. 218. — Un vol. broché, 18 × 25,5, de xii, 357 p. — ISBN 0-8247-0564-5. — Prix: US\$150.00. — Marcel Dekker, New York, 2001.

This book investigates control laws, stability and optimization, and feedback syntheses for systems defined by partial differential equations... chronicles advances in "smart" materials, developing methodology for nonlinear distributed parameter systems (DPS), and in dynamical systems... illuminates the effects of chaotic behavior on linear wave equations... articulates the theory and method for attaining dual control of nonconvex DPS... explains how to achieve bilinear control for semilinear parabolic equations... details modeling, synthesis, and simulation techniques for static buckling and optional control of beams, rods, and nonlinear infinite dimensional systems... and much more.

Panagiotis D. CHRISTOFIDES. — **Nonlinear and robust control of PDE systems: methods and applications to transport-reaction processes.** — Systems & control. — Un vol. relié, 16 × 24, de xv, 248 p. — ISBN 0-8176-4156-4. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

Beginning with an introduction to control of PDE systems, the book discusses nonlinear and robust control of hyperbolic and parabolic PDEs with fixed spatial domains, and parabolic PDEs with time-dependent spatial domains. The synthesis of the controllers is performed by using geometric and Lyapunov-based control techniques. The book includes comparisons of the methods followed for controller synthesis with other approaches and discussions of practical implementation issues that can help researchers and engineers understand the development and application of the methods in greater depth.

Fritz COLONIUS, Uwe HELMKE, Dieter PRÄTZEL-WOLTERS, Fabian WIRTH, (Editors). — **Advances in mathematical systems theory.** — A volume in honor of Diederich Hinrichsen. — Systems & control: foundations & applications. — Un vol. relié, 16 × 24, de xxx, 296 p. — ISBN 0-8176-4162-9. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2000.

The new edited book focuses on the contemporary developments and results in mathematical systems theory and control. The book includes invited peer-reviewed, authoritative expositions and surveys of these fields, presented by leading international researchers. A key theme of the book is the stability and robustness of linear and nonlinear systems using the concepts of stability radii and spectral value sets. Chapters survey recent advances in linear and nonlinear systems theory, including parameterization problems and behaviors of linear systems. In addition, the volume examines controllability and stabilization of infinite-dimensional systems (allowing for hysteresis nonlinearities) with functional analytic and algebraic approaches.

Zoran GAJIĆ, Myo-Taeg LIM. — **Optimal control of singularly perturbed linear systems and applications: high-accuracy techniques.** — Control engineering series. — Un vol. relié, 16 × 24, de xiv, 309 p. — ISBN 0-8247-8976-8. — Prix: US\$150.00. — Marcel Dekker, New York, 2001.

Constructing a unique method applicable to a number of challenging real-world control systems, this book reveals how to achieve high accuracy using slow-fast time scales for determinis-