

# Systemes, contrôle optimal

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large possible, incluant ainsi à la fois les méthodes déterministes (systèmes dynamiques, théorie des jeux) et les méthodes stochastiques (processus aléatoires, statistiques). Chaque modèle mathématique proposé est accompagné d'un exemple concret éclairant la modélisation retenue.

### ***Systemes, contrôle optimal***

Fritz COLONIUS, Wolfgang KLIEMANN. — **The dynamics of control.** — With an appendix by Lars Grüne. — Systems & control. — Un vol. relié, 16×24, de XII, 629 p. — ISBN 0-8176-3683-8. — Prix : SFr. 158.00. — Birkhäuser, Boston, 2000.

The book provides a carefully integrated development of the mathematical connections between nonlinear control, dynamical systems and time-varying perturbed systems for scientists and engineers. The central theme is the notion of control flow with its global dynamics and linearization presented in detail. The book's scope is comprehensive and includes the global theory of dynamical systems under time-varying perturbations, global and local dynamics of control systems, connections between control systems and dynamical systems and the relevant numerical methods for global dynamics, linearization and stability. Topics are developed with a diverse and extensive selection of applied problems from control and dynamical systems.

Eugenius KASZKUREWICZ, Amit BHAYA. — **Matrix diagonal stability in systems and computation.** — Un vol. relié, 16×24, de XIV, 267 p. — ISBN 0-8176-4088-6. — Prix : SFr. 138.00. — Birkhäuser, Boston, 2000.

This book addresses the matrix-stability concept and its applications to the analysis and design of several types of dynamical systems, both discrete-time and continuous-time dynamical systems. The comprehensive presentation begins with an introductory chapter surveying applied examples from diverse fields, i.e., robust stability analysis, asynchronous iterative computation, neural networks and variable structure dynamical systems. The next few chapters develop the theory and include a unified presentation of results in the area of matrix-diagonal stability and D-stability. The remaining chapters examine the various applications in greater detail. Both classical and new results are discussed, and the overall treatment is self contained, only requiring a knowledge of linear algebra, difference equations, and differential equations.

William G. LITVINOV. — **Optimization in elliptic problems with applications to mechanics of deformable bodies and fluid mechanics.** — Operator theory, vol. 119. — Un vol. relié, de 16×24, de XVII, 522 p. — ISBN 3-7643-6199-9. — Prix : SFr. 198.00. — Birkhäuser, Basel, 2000.

This book is unique in that it presents a profound mathematical analysis of general optimization problems for elliptic systems, which are then applied to a great number of optimization problems in mechanics and technology. After the setting of a problem, attention is focused on existence theorems that lead to the construction of approximate solutions. The coefficients of the equations, the shape of the domain, and the right-hand sides of the equations are considered to be controls. Applications include optimization problems arising in mechanics of elastic solids, plates, shells, composite materials and structures fabricated with them, as well as fluid mechanics.

Alexey S. MATVEEV, Andrey V. SAVKIN. — **Qualitative theory of hybrid dynamical systems.** — Control engineering. — Un vol. relié, 16×24, de X, 348 p. — ISBN 0-8176-4141-6. — Prix : SFr. 128.00. — Birkhäuser, Boston, 2000.

This book provides a thorough development and systematic presentation of the foundations and framework for hybrid dynamical systems. The presentation offers an accessible, but precise,

development of the mathematical models, heuristic algorithms and stability criteria. The book largely concentrates on the case of discretely controlled continuous-time systems and their relevance for modeling aspects of flexible manufacturing systems and dynamically routed queuing networks. It is an excellent resource for the study and analysis of hybrid dynamical systems used in systems and control engineering.

### *Information, communication, circuits*

J.W. KAY and D.M. TITTERINGTON, (Editors). — **Statistics and neural networks: advances at the interface.** — Un vol. relié. 16 × 24, de xvii, 260 p. — ISBN 0-19-852422-8. — Prix: £40.00. — Oxford University Press. Oxford, 1999.

There is now a growing awareness of the interface between statistical research and recent advances in neural computing and artificial neural networks. This book covers various aspects of current work in the area, drawing together contributions from authors who are leading researchers in the two fields. Topics covered include: nonlinear approaches to discriminant analysis; information-theoretic neural networks for unsupervised learning; radial basis function networks; techniques for optimizing predictions; approaches to the analysis of latent structure, including probabilistic principal component analysis, density networks and the use of multiple latent variables; and a substantial chapter outlining techniques and their application in industrial case-studies.