

Book Announcements

DAIUTO, B. J., HARTLEY, T. T., and CHICATELLI, S. P., *The Hyperbolic Map and Applications to the Linear Quadratic Regulator*, Lecture Notes in Control and Information Sciences, Vol. 110, Springer-Verlag, New York, 1989, 114 pages.

Purpose: This research monograph discusses the theory of the discrete-time hyperbolic map. The dynamics of the map are analyzed from the viewpoints of stability, quasiperiodicity, and chaos.

Contents: Qualitative dynamics of the hyperbolic iteration map; general solution derivation of the hyperbolic iteration map; linear quadratic regulator—background and effects of negative Q ; introduction to chaos.

ZHANG, X. J., *Auxiliary Signal Design in Fault Detection and Diagnosis*, Lecture Notes in Control and Information Sciences, Vol. 134, Springer-Verlag, Berlin, 1989, 213 pages.

Purpose: This work is concerned with the theory and application of auxiliary signal design in fault detection and diagnosis of systems that can be represented by linear multi-input/multi-output stochastic models.

Contents: Preliminaries; sequential probability ratio test; auxiliary signals for improving fault detection; extension to multiple hypothesis testing; modeling, identification, fault detection, and diagnosis of chemical processes.

RASBAND, S. N., *Chaotic Dynamics of Nonlinear Systems*, Wiley, New York, 1990, 230 pages.

Purpose: The major models for the transitions to chaos exhibited by dynamic systems are presented. Classical topics, fundamental examples, and exercises are included.

Contents: One-dimensional maps; universality theory; fractal dimension; differential dynamics; nonlinear examples with chaos; two-dimensional maps; conservative dynamics; measures of chaos; complexity and chaos.

BERMAN, A., NEUMANN, M. and STERN, R., *Non-negative Matrices in Dynamic Systems*, Wiley, New York, 1989, 167 pages.

Purpose: The application of the theory of non-negative matrices to certain problems arising in positive linear differential and control systems is the focus of this volume.

Contents: Convex sets; Matrix theory background; differential and control system preliminaries; exponentially non-negative matrices; extended M -matrices; Cone reachability; applications to feedback control; controllability, observability, and realizability of positive control systems.

PEDRYCZ, W., *Fuzzy Control and Fuzzy Systems*, RSP Ltd., Taunton, Somerset, U.K., 1989, 258 pages; distributed by Wiley, New York.

Purpose: The aim of this book is to study the state-of-the-art of fuzzy sets and their application in control engineering. No assumption of previous knowledge of the subject is made.

Contents: Introduction to fuzzy sets; fuzzy controllers—preliminaries and basic construction; fuzzy relational equations; design aspects of the fuzzy controller; theoretical developments in the construction of fuzzy controllers; identification of fuzzy models; prediction and control in fuzzy models; models of decision-making and some topics of fuzzy arithmetic in setting fuzzy relational equations.

STEPAN, G., *Retarded Dynamical Systems: Stability and Characteristic Functions*, Pitman Research Notes in Mathematics, Series 210, Longman Scientific and Technical, U.K., and Wiley, New York, 151 pages.

Purpose: This research note gives an analytical stability criterion for autonomous retarded functional differential equations. Examples are drawn from the fields of robotics, man-machine systems, machine dynamics, and bioecology.

Contents: Introduction and survey; direct stability investigation; stability charts; applications.