

Book Announcements

KOSKO, B., *Neural Networks and Fuzzy Systems*, Prentice-Hall, Englewood Cliffs, NJ, 1992, 449 pages.

Purpose: This book presents neural networks and fuzzy theory from a unified engineering perspective. The basic theory uses only elementary calculus, linear algebra, and probability.

Contents: Neural networks and fuzzy systems; neuronal dynamics: activations and signals, and activation models; synaptic dynamics: unsupervised and supervised learning; architectures and equilibria; fuzziness versus probability; fuzzy associative memories; comparison of fuzzy and neural truck backer-upper control systems; fuzzy image transform coding; comparison of fuzzy and Kalman filter target tracking control systems; neural and fuzzy software instructions.

BITTANTI, S., LAUB, A. J., and WILLEMS, J. C. (eds.), *The Riccati Equation*, Springer-Verlag, Berlin, 1991, 338 pages, \$98.00.

Purpose: This book presents, in a tutorial fashion, a self-contained treatment of the main issues evolving around the Riccati equation, in particular theory, applications, and numerical algorithms.

Contents: Count Riccati and the early days of the Riccati equation; solutions of the continuous and discrete time algebraic Riccati equations: a review; Hermitian and definite solutions; geometric view of the matrix Riccati equation; geometry of the matrix Riccati equation and associated eigenvalue methods; periodic Riccati equation; invariant subspace methods; dissipation inequality; infinite horizon and receding horizon LQ-problems with partial stabilization constraints; Riccati difference and differential equations: convergence, monotonicity, and stability; generalized Riccati equation in dynamic games.

ISERMANN, R., *Digital Control Systems, Volume 2: Stochastic Control, Multivariable Control, Adaptive Control, Applications*, 2nd ed., Springer-Verlag, Berlin, 1991, 325 pages, \$79.00.

Purpose: This book presents advanced topics in control design for linear sampled-data systems.

Contents: Stochastic control systems; parameter-optimized controllers for stochastic disturbances; minimum variance controllers for stochastic disturbances; state controllers for stochastic disturbances; cascade control systems; feedforward control; structures of multivariable processes; parameter-optimized multivariable control systems; multivariable matrix polynomial control systems; multivariable state control systems; state estimation; adaptive control systems; on-line identification of dynamical processes and stochastic signals; on-line identification in closed loop; parameter-adaptive controllers; influence of amplitude quantization for digital control; filtering of disturbances; combining control algorithms and actuators; computer-aided control algorithm design; adaptive self-tuning control systems using microcomputers and process computers.

WEINMANN, A., *Uncertain Models and Robust Control*, Springer-Verlag, Vienna, 1991, 722 pages, \$129.00.

Purpose: This monograph is devoted to systems and their approximate models and to the discussion of their uncertainties.

Contents: Introduction; differential sensitivity; small-scale perturbation; robustness in the time and frequency domains; coprime factorization and minimax frequency optimization; robustness via approximative models.

BROWN, R. G., and HWANG, P. Y. C., *Introduction to Random Signals and Applied Kalman Filtering*, Wiley, 1992, 502 pages, \$17.50.

Purpose: This is a text on random signal processing and optimal filtering suitable for graduate students as well as practicing engineers.

Contents: Probability and random variables; mathematical description of random signals; response of linear systems to random inputs; Wiener filtering; discrete and continuous Kalman filters; discrete smoothing and prediction; linearization and additional topics on applied Kalman filtering; Global positioning system: a case study; Kalman filter software.