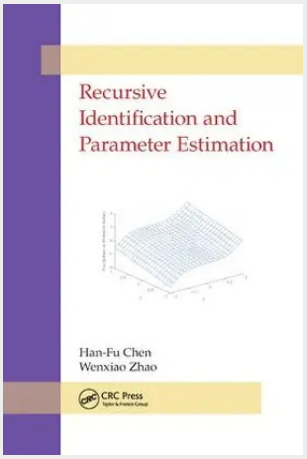
Chen / Zhao

Recursive Identification and Parameter Estimation

Recursive Identification and Parameter Estimation describes a recursive approach to solving system identification and parameter estimation problems arising from diverse areas. Supplying rigorous theoretical analysis, it presents the material and proposed algorithms in a manner that makes it easy to understand—providing readers with the modeling and identification skills required for successful theoretical research and effective application. The book begins by introducing the basic concepts of probability theory, including martingales, martingale difference sequences, Markov chains, mixing processes, and stationary processes. Next, it discusses the root-seeking problem for functions, starting with the classic RM algorithm, but with attention mainly paid to the stochastic approximation algorithms with expanding truncations (SAAWET) which serves as the basic tool for recursively solving the problems addressed in the book. The book not only identifies the results of system identification and parameter estimation, but also demonstrates how to apply the proposed approaches for addressing problems in a range of areas, including: - Identification of ARMAX systems without imposing restrictive conditions - Identification of typical nonlinear systems - Optimal adaptive tracking - Consensus of multi-agents systems - Principal component analysis - Distributed randomized PageRank computation This book recursively identifies autoregressive and moving average with exogenous input (ARMAX) and discusses the identification of non-linear systems. It concludes by addressing the problems arising from different areas that are solved by SAAWET. Demonstrating how to apply the proposed approaches to solve problems across a range of areas, the book is suitable for students, researchers, and engineers working in systems and control, signal processing, communication, and mathematical statistics.



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