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Chapter 5 Methods of Best Approximation for Nonlinear Operators 5.1 Introduction; 5.2 Best Approximation of Nonlinear Operators in Banach Spaces: "Deterministic" Case; 5.3 Estimation of Mean and Covariance Matrix for Random Vectors; 5.4 Best Hadamard-quadratic Approximation; 5.5 Best r-Degree Polynomial Approximation; 5.6 Best Causal Approximation; 5.7 Best Hybrid Approximations; 5.8 Concluding Remarks; Part II Optimal Estimation of Random Vectors; Chapter 6 Computational Methods for Optimal Filtering of Stochastic Signals; 6.1 Introduction 6.2 Optimal Linear Filtering in Finite Dimensional Vector Spaces 6.3 Optimal Linear Filtering in Hilbert Spaces; 6.4 Optimal Causal Linear Filtering with Piecewise Constant Memory; 6.5 Optimal Causal Polynomial Filtering with Arbitrarily Variable Memory; 6.6 Optimal Nonlinear Filtering with no Memory Constraint; 6.7 Concluding Remarks; Chapter 7 Computational Methods for Optimal Compression and Reconstruction of Random Data; 7.1 Introduction; 7.2 Standard Principal Component Analysis and Karhunen-Loeve Transform (PCA-KLT); 7.3 Rank-constrained Matrix Approximations 7.4 A Generic Principal Component Analysis and Karhunen-Loeve Transform 7.5 Optimal Hybrid Transform Based on Hadamard-quadratic Approximation; 7.6 Optimal Transform Formed by a Combination of Nonlinear Operators; 7.7 Optimal Generalized Hybrid Transform; 7.8 Concluding Remarks; Bibliography; Index; Series Page

Sommario/riassunto

In this book, we study theoretical and practical aspects of computing methods for mathematical modelling of nonlinear systems. A number of computing techniques are considered, such as methods of operator approximation with any given accuracy; operator interpolation techniques including a non-Lagrange interpolation; methods of system representation subject to constraints associated with concepts of causality, memory and stationarity; methods of system representation with an accuracy that is the best within a given class of models; methods of covariance matrix estimation; methods for low-rank
