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Chapter 3 Algebraic Parameter Identification in Nonlinear Systems 3.1 Introduction; 3.2 Algebraic Parameter Identification for Nonlinear Systems; 3.2.1 Controlling an Uncertain Pendulum; 3.2.2 A Block-Driving Problem; 3.2.3 The Fully Actuated Rigid Body; 3.2.4 Parameter Identification Under Sliding Motions; 3.2.5 Control of an Uncertain Inverted Pendulum Driven by a DC Motor; 3.2.6 Identification and Control of a Convey Crane; 3.2.7 Identification of a Magnetic Levitation System; 3.3 An Alternative Construction of the System of Linear Equations; 3.3.1 Genesisio-Tesi Chaotic System 3.3.2 The Ueda Oscillator 3.3.3 Identification and Control of an Uncertain Brushless DC Motor; 3.3.4 Parameter Identification and Self-tuned Control for the Inertia Wheel Pendulum; 3.3.5 Algebraic Parameter Identification for Induction Motors; 3.3.6 A Criterion to Determine the Estimator Convergence: The Error Index; 3.4 Remarks; References; Chapter 4 Algebraic Parameter Identification in Discrete-Time Systems; 4.1 Introduction; 4.2 Algebraic Parameter Identification in Discrete-Time Systems; 4.2.1 Main Purpose of the Chapter; 4.2.2 Problem Formulation and Assumptions 4.2.3 An Introductory Example 4.2.4 Samuelson's Model of the National Economy; 4.2.5 Heating of a Slab from Two Boundary Points; 4.2.6 An Exact Backward Shift Reconstructor; 4.3 A Nonlinear Filtering Scheme; 4.3.1 Henon System; 4.3.2 A Hard Disk Drive; 4.3.3 The Visual Servo Tracking Problem; 4.3.4 A Shape Control Problem in a Rolling Mill; 4.3.5 Algebraic Frequency Identification of a Sinusoidal Signal by Means of Exact Discretization; 4.4 Algebraic Identification in Fast-Sampled Linear Systems; 4.4.1 The Delta-Operator Approach: A Theoretical Framework; 4.4.2 Delta-Transform Properties 4.4.3 A DC Motor Example

Sommario/riassunto

"Presents a model-based algebraic approach to on-line parameter and state estimation in uncertain dynamic feedback control systems Algebraic Identification and Estimation Methods in Feedback Control Systems presents the model-based algebraic approach to on-line parameter and state estimation in uncertain dynamic feedback control systems. This approach evades the mathematical intricacies of the traditional stochastic approach, proposing a direct model-based scheme with several, easy to implement, computational advantages. This book contains many illustrative, tutorial style, developed examples of the recently introduced algebraic approach for parameter and state estimation in a variety of physical systems of continuous, and discrete, nature. The developments include some laboratory experimental results in several areas related to mechatronics systems. The reader, with an engineering level mathematical background and through the many expository examples, will be able to master the use and understand the consequences of the highly theoretical differential algebraic viewpoint in control systems theory"--

"Algebraic Identification and Estimation Methods in Feedback Control Systems presents the model-based algebraic approach to on-line parameter and state estimation in uncertain dynamic feedback control systems"--