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Soggetti	System theory Automatic control Robotics Mechatronics Calculus of variations Approximation theory Probabilities Computer science - Mathematics Systems Theory, Control Control, Robotics, Mechatronics Calculus of Variations and Optimal Control; Optimization Approximations and Expansions Probability Theory and Stochastic Processes Computational Mathematics and Numerical Analysis
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Part I. Introduction -- Introductory Remarks -- Historical Perspective -- Outline of Contents -- Part II. Problem Statement -- Deterministic Systems -- Stochastic Systems -- General Problem -- Part III. The Direct Method Approach: Generalities -- General Approach -- Gradient and Integration Methods -- Representation Methods -- Part IV. Gradient and Integration Methods in Control Problems -- Computation of Gradients for ODE Problems -- Computation of Gradients for PDE Problems -- Integration Methods -- Part V. Representation Methods -- Ritz–Galerkin Expansion -- Karhunen–Loeve Expansion -- Lévy Processes -- Bibliography -- Index .

Sommario/riassunto

The primary focus of this book is on explicating the direct method approach. Historically, direct methods have not been fully exploited in control problems. The key is constructing convergent minimizing families. Integration methods (for example the gradient method) and representation methods (such as the Ritz-Galerkin and Finite Element methods) are examined in this text in an abstract (with concrete examples) functional analytic way. The aim is to consider direct methods from a unified general point of view and to provide a stimulus for future research. Explicitly, implicitly and by example, potential areas of research interest are indicated. The book is a suitable reference for graduate students, researchers, applied mathematicians, and control engineers. Some of the material is of independent mathematical interest. The work may be used as a text for a graduate course or seminar on direct methods in control. A degree of mathematical sophistication and some knowledge of control theory is required.
