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Nota di contenuto	Chapter 1. Introduction -- Chapter 2. Finite-Dimensional Dynamical Systems -- Chapter 3. Stability and Robustness -- Chapter 4. Method of Lyapunov Function -- Chapter 5. Linear Dilation in Euclidean Space -- Chapter 6. Finite-dimensional Homogeneous Mappings -- Chapter 7. Analysis of Homogeneous Systems -- Chapter 8. Discretization of Homogeneous Systems -- Chapter 9. Homogeneous Stabilization of Linear Plant -- Chapter 10. Digitization of Homogeneous Control -- Chapter 11. Upgrading Linear Controller to Homogeneous Feedback -- Chapter 12. Safety-Critical Homogeneous Systems -- Chapter 13. Homogeneous Optimal Control -- Chapter 14. Homogeneous State Estimation -- Chapter 15. Homogeneous Control of Nonlinear Plants -- Chapter 16. Homogeneous Artificial Neural Network -- Chapter 17. Homogeneity in Multi-Agent Systems -- Appendix.
Sommario/riassunto	This book is an introduction to the theory of homogeneous systems, useful for the simplification of many types of nonlinear control problems. It propounds methods that can be employed when

linearization proves unsuitable and provides a unified approach to stability and robustness analysis, control and observer design, and system discretization. The second edition splits the coverage of homogeneity, allowing expanded coverage of finite-dimensional systems (in this book) and infinite-dimensional systems (in Volume II). The results are better systematized and easier for readers to study and assimilate. The first volume details the concepts of finite-time and fixed-time stability. Key features of the book include: mathematical models of dynamical systems in finite-dimensional spaces; the theory of linear dilations in Euclidean spaces; homogeneous control and estimation; extensively expanded and original chapters with entirely new treatments of digitization, safety-critical systems, neural networks, and multiagent control; simple methods for an upgrade of existing linear control laws; numerical schemes for a consistent digital implementation of homogeneous algorithms; and experimental results that confirm an improvement of PID controllers. Illustrative examples—numerical results, computer simulations, and real experiments—support all the theoretical material. The coverage of finite-dimensional systems presented in this book is of interest to graduate students of control theory from engineering and applied-mathematical backgrounds and to practising control engineers.