1. Record Nr. UNINA9911018759503321

Autore	Polyakov Andrey
Titolo	Generalized Homogeneity in Systems and Control Volume II : Infinite-Dimensional Systems / / by Andrey Polyakov
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	9783031774966 9783031774959
Edizione	[2nd ed. 2025.]
Descrizione fisica	1 online resource (711 pages)
Collana	Communications and Control Engineering, , 2197-7119
Disciplina	629.8
Soggetti	Automatic control System theory Control theory Engineering mathematics Control and Systems Theory Systems Theory, Control Engineering Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1. Introduction to Abstract Homogeneity -- Chapter 2. Abstract Differential Equations -- Chapter 3. Lyapunov Methods for Abstract Differential Equations -- Chapter 4. Linear Dilations in Abstract Spaces -- Chapter 5. Infinite-Dimensional Homogeneous Mappings -- Chapter 6. Analysis of Infinite-Dimensional Homogeneous Systems -- Chapter 7. Discretization of Infinite-Dimensional Homogeneous Systems -- Chapter 8. Homogeneous Stabilization of Infinite-Dimensional Systems.
Sommario/riassunto	The second edition of Generalized Homogeneity in Systems and Control is an introduction to the theory of homogeneous systems, useful for the simplification of many types of nonlinear control problem. 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 Volume I) and infinite-

dimensional systems (in this book). The results are better systematized and easier for readers to study and assimilate. Generalized Homogeneity in Systems and Control Volume II (second edition) moves from stability analysis to the design of controllers for various systems. Key features of the book include: mathematical models of dynamical systems in infinite-dimensional spaces; the theory of linear dilations in Banach and Hilbert spaces (including Lebesgue and Sobolev spaces); abstract differential equations with homogeneous operators (including differential operators); rewritten, reorganized chapters with the addition of substantial new material; robustness analysis of infinite-dimensional homogeneous systems; homogeneous control in a Hilbert space; and consistent discretization of homogeneous systems. Illustrative examples – numerical results, computer simulations and real experiments – support all the theoretical material. The coverage of infinite-dimensional systems presented in this book will be of interest to graduate students of control theory and applied mathematics and academic researchers in control.