

1. Record Nr.	UNINA9910254176603321
Autore	Isidori Alberto
Titolo	Lectures in Feedback Design for Multivariable Systems // by Alberto Isidori
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017
ISBN	3-319-42031-3
Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (XI, 413 p. 27 illus., 5 illus. in color.)
Collana	Advanced Textbooks in Control and Signal Processing, , 1439-2232
Disciplina	629.83
Soggetti	Automatic control System theory Statistical physics Calculus of variations Control and Systems Theory Systems Theory, Control Applications of Nonlinear Dynamics and Chaos Theory Calculus of Variations and Optimal Control; Optimization
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	An Overview -- Part I: Linear Systems -- Stabilization of Minimum-Phase Linear Systems -- The Small-Gain Theorem for Linear Systems and Its Application to Robust Stability -- Regulation and Tracking in Linear Systems -- Coordination of Linear Systems -- Part II: Nonlinear Systems -- Stabilization of Nonlinear Systems via State Feedback -- Nonlinear Observers and the Separation Principle -- Robust Stabilization of Nonlinear Systems via Dynamic Output Feedback -- The Small-Gain Theorem for Nonlinear Systems and Its Application to Robust Stability -- The Structure of Multivariable Systems -- Stabilization of Multivariable Nonlinear Systems -- Regulation and Tracking in Nonlinear Systems -- Appendices: A Few Results in Linear Systems Theory -- Stability and Asymptotic Behavior of Nonlinear Systems.
Sommario/riassunto	This book focuses on methods that relate, in one form or another, to the "small-gain theorem". It is aimed at readers who are interested in

learning methods for the design of feedback laws for linear and nonlinear multivariable systems in the presence of model uncertainties. With worked examples throughout, it includes both introductory material and more advanced topics. Divided into two parts, the first covers relevant aspects of linear-systems theory, the second, nonlinear theory. In order to deepen readers' understanding, simpler single-input–single-output systems generally precede treatment of more complex multi-input–multi-output (MIMO) systems and linear systems precede nonlinear systems. This approach is used throughout, including in the final chapters, which explain the latest advanced ideas governing the stabilization, regulation, and tracking of nonlinear MIMO systems. Two major design problems are considered, both in the presence of model uncertainties: asymptotic stabilization with a “guaranteed region of attraction” of a given equilibrium point and asymptotic rejection of the effect of exogenous (disturbance) inputs on selected regulated outputs. Much of the introductory instructional material in this book has been developed for teaching students, while the final coverage of nonlinear MIMO systems offers readers a first coordinated treatment of completely novel results. The worked examples presented provide the instructor with ready-to-use material to help students to understand the mathematical theory. Readers should be familiar with the fundamentals of linear-systems and control theory. This book is a valuable resource for students following postgraduate programs in systems and control, as well as engineers working on the control of robotic, mechatronic and power systems.
