

1. Record Nr.	UNINA9910300532303321
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Titolo	Advances in Synchronization of Coupled Fractional Order Systems : Fundamentals and Methods // by Rafael Martínez-Guerra, Claudia Alejandra Pérez-Pinacho
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018
ISBN	3-319-93946-7
Edizione	[1st ed. 2018.]
Descrizione fisica	1 online resource (XIX, 185 p. 66 illus., 59 illus. in color.)
Collana	Understanding Complex Systems, , 1860-0840
Disciplina	515.83
Soggetti	Mathematical physics Multibody systems Vibration Mechanics, Applied Nonlinear Optics Dynamics Nonlinear theories Theoretical, Mathematical and Computational Physics Multibody Systems and Mechanical Vibrations Applied Dynamical Systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface -- Introduction -- Basic Concepts and Preliminares -- Synchronization of Chaotic Systems by means of a nonlinear observer: An application to Secure Communications -- Synchronization for Chaotic system through an Observer using the Immersion and Invariance (I&I) Approach -- Synchronization of Nonlinear Fractional Order Systems by Means of PIra Reduced Order Observer -- Estimators for a class of commensurate fractional order systems with Caputo derivative -- Generalized Multi-synchronization of Fractional Order Liouvillian Chaotic Systems using Fractional Dynamical Controller -- An Observer for a Class of Incommensurate Fractional Order Systems -- Fractional Generalized quasi-synchronization of incommensurate fractional order oscillators -- Synchronization and Anti-

synchronization of fractional order chaotic systems by means of a fractional integral observer -- Appendix -- Index.

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## Sommario/riassunto

After a short introduction to the fundamentals, this book provides a detailed account of major advances in applying fractional calculus to dynamical systems. Fractional order dynamical systems currently continue to gain further importance in many areas of science and engineering. As with many other approaches to mathematical modeling, the first issue to be addressed is the need to couple a definition of the fractional differentiation or integration operator with the types of dynamical systems that are analyzed. As such, for the fundamentals the focus is on basic aspects of fractional calculus, in particular stability analysis, which is required to tackle synchronization in coupled fractional order systems, to understand the essence of estimators for related integer order systems, and to keep track of the interplay between synchronization and parameter observation. This serves as the common basis for the more advanced topics and applications presented in the subsequent chapters, which include an introduction to the 'Immersion and Invariance' (I&I) methodology, the masterslave synchronization scheme for partially known nonlinear fractional order systems, Fractional Algebraic Observability (FAO) and Fractional Generalized quasi-Synchronization (FGqS) to name but a few. This book is intended not only for applied mathematicians and theoretical physicists, but also for anyone in applied science dealing with complex nonlinear systems. .

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