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Titolo	Identifiability and Regression Analysis of Biological Systems Models : Statistical and Mathematical Foundations and R Scripts // by Paola Lecca
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Descrizione fisica	1 online resource (X, 82 p. 13 illus., 8 illus. in color.)
Collana	SpringerBriefs in Statistics, , 2191-5458
Disciplina	572.0727
Soggetti	Biometry Bioinformatics Statistics Biomathematics Biostatistics Computational and Systems Biology Statistical Theory and Methods Mathematical and Computational Biology Statistics in Engineering, Physics, Computer Science, Chemistry and Earth Sciences
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	1 Complex systems and sets of data -- 2 Dynamic models -- 3 Model identifiability -- 4 Relationships between phenomena -- 5 Codes.
Sommario/riassunto	This richly illustrated book presents the objectives of, and the latest techniques for, the identifiability analysis and standard and robust regression analysis of complex dynamical models. The book first provides a definition of complexity in dynamic systems by introducing readers to the concepts of system size, density of interactions, stiff dynamics, and hybrid nature of determination. In turn, it presents the mathematical foundations of and algorithmic procedures for model structural and practical identifiability analysis, multilinear and non-linear regression analysis, and best predictor selection. Although the

main fields of application discussed in the book are biochemistry and systems biology, the methodologies described can also be employed in other disciplines such as physics and the environmental sciences. Readers will learn how to deal with problems such as determining the identifiability conditions, searching for an identifiable model, and conducting their own regression analysis and diagnostics without supervision. Featuring a wealth of real-world examples, exercises, and codes in R, the book addresses the needs of doctoral students and researchers in bioinformatics, bioengineering, systems biology, biophysics, biochemistry, the environmental sciences and experimental physics. Readers should be familiar with the fundamentals of probability and statistics (as provided in first-year university courses) and a basic grasp of R.

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