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Titolo	Methods of Mathematical Modelling : Continuous Systems and Differential Equations // by Thomas Witelski, Mark Bowen
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ISBN	3-319-23042-5
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (XVIII, 305 p. 50 illus., 45 illus. in color.)
Collana	Springer Undergraduate Mathematics Series, , 1615-2085
Disciplina	511.8
Soggetti	Differential equations Differential equations, Partial Mathematical physics Mathematical models Calculus of variations Ordinary Differential Equations Partial Differential Equations Mathematical Applications in the Physical Sciences Mathematical Modeling and Industrial Mathematics Calculus of Variations and Optimal Control; Optimization
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Rate equations -- Transport equations -- Variational principles -- Dimensional scaling analysis -- Self-similar scaling solutions of differential equations -- Perturbation methods -- Boundary layer theory -- Long-wave asymptotics for PDE problems -- Weakly-nonlinear oscillators -- Fast/slow dynamical systems -- Reduced models for PDE problems -- Modelling in applied fluid dynamics.
Sommario/riassunto	This book presents mathematical modelling and the integrated process of formulating sets of equations to describe real-world problems. It describes methods for obtaining solutions of challenging differential equations stemming from problems in areas such as chemical reactions, population dynamics, mechanical systems, and fluid mechanics. Chapters 1 to 4 cover essential topics in ordinary differential equations, transport equations and the calculus of

variations that are important for formulating models. Chapters 5 to 11 then develop more advanced techniques including similarity solutions, matched asymptotic expansions, multiple scale analysis, long-wave models, and fast/slow dynamical systems. Methods of Mathematical Modelling will be useful for advanced undergraduate or beginning graduate students in applied mathematics, engineering and other applied sciences.
