

1. Record Nr.	UNINA9910299987603321
Titolo	Reduced Order Methods for Modeling and Computational Reduction // edited by Alfio Quarteroni, Gianluigi Rozza
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-02090-0
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (338 p.)
Collana	MS&A, Modeling, Simulation and Applications, , 2037-5263 ; ; 9
Disciplina	004.0151
Soggetti	Mathematics - Data processing Numerical analysis Engineering mathematics Engineering - Data processing Mathematical models Mechanics, Applied Solids Mathematical physics Computational Mathematics and Numerical Analysis Numerical Analysis Mathematical and Computational Engineering Applications Mathematical Modeling and Industrial Mathematics Solid Mechanics Theoretical, Mathematical and Computational Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references.
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#### Sommario/riassunto

This monograph addresses the state of the art of reduced order methods for modeling and computational reduction of complex parametrized systems, governed by ordinary and/or partial differential equations, with a special emphasis on real time computing techniques and applications in computational mechanics, bioengineering and computer graphics. Several topics are covered, including: design, optimization, and control theory in real-time with applications in engineering; data assimilation, geometry registration, and parameter estimation with special attention to real-time computing in biomedical engineering and computational physics; real-time visualization of physics-based simulations in computer science; the treatment of high-dimensional problems in state space, physical space, or parameter space; the interactions between different model reduction and dimensionality reduction approaches; the development of general error estimation frameworks which take into account both model and discretization effects. This book is primarily addressed to computational scientists interested in computational reduction techniques for large scale differential problems.

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