1. Record Nr.	UNINA9910300147203321
Titolo	Finite Volumes for Complex Applications VII-Methods and Theoretical Aspects : FVCA 7, Berlin, June 2014 / / edited by Jürgen Fuhrmann, Mario Ohlberger, Christian Rohde
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-05684-0
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (450 p.)
Collana	Springer Proceedings in Mathematics & Statistics, , 2194-1009 ; ; 77
Disciplina	532
Soggetti	Numerical analysis Physics Computer simulation Partial differential equations Numerical Analysis Numerical and Computational Physics, Simulation Simulation and Modeling Partial Differential Equations
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 and index.
Nota di contenuto	Part I Invited contributions. P. Bochev: Compatible Discretizations for Partial Differential Equations -- F. Bouchu: Finite Volume Methods for Shallow Water Equations, Hyperbolic Equations, Magnetohydrodynamics -- C. Chainais-Hillairet: Finite Volume Methods for Drift-Diffusion Equations -- M. Dumbser: High Order One-Step AMR and ALE Methods for Hyperbolic PDE -- P. Helluy: Compressible Multiphase Flows -- K. Mikula: Finite Volumes in Image Processing and Groundwater Flow -- S. Mishra: Finite Volume Methods for Conservation Laws, Uncertainty Quantification -- Part II Theoretical aspects of Finite Volume Methods.
Sommario/riassunto	The first volume of the proceedings of the 7th conference on "Finite Volumes for Complex Applications" (Berlin, June 2014) covers topics that include convergence and stability analysis, as well as investigations of these methods from the point of view of compatibility with physical principles. It collects together the focused invited papers, as well as the

reviewed contributions from internationally leading researchers in the field of analysis of finite volume and related methods. Altogether, a rather comprehensive overview is given of the state of the art in the field. The finite volume method in its various forms is a space discretization technique for partial differential equations based on the fundamental physical principle of conservation. Recent decades have brought significant success in the theoretical understanding of the method. Many finite volume methods preserve further qualitative or asymptotic properties, including maximum principles, dissipativity, monotone decay of free energy, and asymptotic stability. Due to these properties, finite volume methods belong to the wider class of compatible discretization methods, which preserve qualitative properties of continuous problems at the discrete level. This structural approach to the discretization of partial differential equations becomes particularly important for multiphysics and multiscale applications. Researchers, PhD and masters level students in numerical analysis, scientific computing and related fields such as partial differential equations will find this volume useful, as will engineers working in numerical modeling and simulations.