1.	Record Nr.	UNINA9910143094703321
	Autore	Bona Carles
	Titolo	Elements of numerical relativity and relativistic hydrodynamics : from Einstein's equations to astrophysical simulations / / C. Bona, C. Palenzuela-Luque, C. Bona-Casas
	Pubbl/distr/stampa	Berlin ; ; Heidelberg, : Springer-Verlag, c2009
	ISBN	9786613562807 9781280384882 1280384883 9783642011641 3642011640
	Edizione	[2nd ed.]
	Descrizione fisica	1 online resource (XIV, 214 p. 108 illus.)
	Collana	Lecture notes in physics ; ; [783]
	Classificazione	UD 8220
	Altri autori (Persone)	Bona-CasasC (Carles) Palenzuela-LuqueCarlos
	Disciplina	530.11
	Soggetti	Einstein field equations - Numerical solutions Evolution equations - Numerical solutions Relativity (Physics) Space and time - Mathematics
	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	The 4D Spacetime -- The Evolution Formalism -- Free Evolution -- First-Order Hyperbolic Systems -- Numerical Methods -- Black Hole Simulations -- Matter Spacetimes.
	Sommario/riassunto	Many large-scale projects for detecting gravitational radiation are currently being developed, all with the aim of opening a new window onto the observable Universe. As a result, numerical relativity has recently become a major field of research, and Elements of Numerical Relativity and Relativistic Hydrodynamics is a valuable primer for both graduate students and non-specialist researchers wishing to enter the field. A revised and significantly enlarged edition of LNP 673 Elements of Numerical Relativity, this book starts with the most basic insights and aspects of numerical relativity before it develops coherent guidelines for the reliable and convenient selection of each of the

following key aspects: evolution formalism; gauge, initial, and boundary conditions; and various numerical algorithms. And in addition to many revisions, it includes new, convenient damping terms for numerical implementations, a presentation of the recently-developed harmonic formalism, and an extensive, new chapter on matter space-times, containing a thorough introduction to relativistic hydrodynamics. While proper reference is given to advanced applications requiring large computational resources, most tests and applications in this book can be performed on a standard PC. From the Reviews of the 1st edition I am glad to recommend this book to anyone interested in an introduction into this field." Bela Szilagyi, (Mathematical Reviews, Issue 2007 b).