Numerical relativity : solving Einstein's equations on the computer

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Abstrak

Aimed at students and researchers entering the field, this pedagogical introduction to numerical relativity will also interest scientists seeking a broad survey of its challenges and achievements. --
Assuming only a basic knowledge of classical general relativity, this textbook develops the mathematical formalism from first principles, then highlights some of the pioneering simulations involving black holes and neutron stars, gravitational collapse and gravitational waves. --
Applications include calculations of coalescing binary black holes and binary neutron stars, rotating stars, colliding star clusters, gravitational and magnetorotational collapse, critical phenomena, the generation of gravitational waves, and many more. --
"...an excellent introduction...covering both mathematical aspects and numerical techniques... The authors are world leaders in numerical relativity...This book will soon become the standard advanced text for younger researchers entering the field and will also serve as the authoritative reference for senior researchers..." Abhay Ashtekhar, Director, Institute for Gravitation and the Cosmos, The Pennsylvania State University --
"Numerical relativity has come of age...Two leading experts give a lucid as well as richly detailed account building a bridge from the basics to current research-highly recommended." Bernd Brugmann, Friedrich-Schiller-Universitot --
"...what a book this is!...a genuine learning manual...exceedingly well written...covers virtually all aspects of numerical relativity...replete with beautiful and helpful diagrams...a useful reference to the researcher and a source of enlightenment to many a student...." Eric Poisson, University of Guelph --
"Baumgarte and Shapiro are established leaders in this subject. Their book is a timely contribution to the literature, and the ideal primer for researchers newly attracted to the burgeoning field of computational relativity." Martin Rees, Astronomer Royal and Master of Trinity College, Cambridge --Book Jacket.