1. Record Nr.   UNINA9910300250803321

   Autore   Amadori Debora

   Titolo   Error estimates for well-balanced schemes on simple balance laws
                       [[electronic resource]] : one-dimensional position-dependent models /
                       / by Debora Amadori, Laurent Gosse

   Pubbl/distr/stampa Cham : , : Springer International Publishing : , : Imprint : Springer, ,
                       2015

   ISBN   3-319-24785-9

   Edizione   [1st ed. 2015.]

   Descrizione fisica 1 online resource (119 p.)

   Collana   SpringerBriefs in Mathematics, , 2191-8198

   Disciplina   515.3535

   Soggetti   Partial differential equations
                       Numerical analysis
                       Mathematical physics
                       Physics
                       Partial Differential Equations
                       Numerical Analysis
                       Mathematical Applications in the Physical Sciences
                       Numerical and Computational Physics, Simulation

   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 at the end of each chapters and
                       index.

   Nota di contenuto   1 Introduction -- 2 Local and global error estimates -- 3 Position-
                       dependent scalar balance laws -- 4 Lyapunov functional for inertial
                       approximations -- 5 Entropy dissipation and comparison with
                       Lyapunov estimates -- 6 Conclusion and outlook.

   Sommario/riassunto This monograph presents, in an attractive and self-contained form,
                       techniques based on the L1 stability theory derived at the end of the
                       1990s by A. Bressan, T.-P. Liu and T. Yang that yield original error
                       estimates for so-called well-balanced numerical schemes solving 1D
                       hyperbolic systems of balance laws. Rigorous error estimates are
                       presented for both scalar balance laws and a position-dependent
                       relaxation system, in inertial approximation. Such estimates shed light
                       on why those algorithms based on source terms handled like "local
                       scatterers" can outperform other, more standard, numerical schemes.

Two-dimensional Riemann problems for the linear wave equation are also solved, with discussion of the issues raised relating to the treatment of 2D balance laws. All of the material provided in this book is highly relevant for the understanding of well-balanced schemes and will contribute to future improvements.