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Nonlinear stability of finite volume methods for hyperbolic conservation laws and well-balanced schemes for sources. (English) [Zbl 1086.65091](#)

Frontiers in Mathematics. Basel: Birkhäuser (ISBN 3-7643-6665-6/pbk). viii, 135 p. (2004).

This is a very interesting and useful book which provides a systematic presentation of the theory of finite volume methods and numerical simulations for hyperbolic systems of conservation laws.

It contains six chapters as follows: Quasilinear systems and conservation laws (introductory chapter); Conservative schemes; Source terms; Nonconservative schemes; Multidimensional finite volumes with sources; Numerical tests with source.

The author provides a unified approach and notation to the study of nonlinear stability of finite volume methods for hyperbolic systems of conservation laws as the accent is put on the development of tools and design of schemes. The exposition of the book is very clear. It will be a very useful tool for the researchers in this field as well as for engineers.

Reviewer: [Emil Minchev \(Russe\)](#)

MSC:

- [65M12](#) Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs
- [65-02](#) Research exposition (monographs, survey articles) pertaining to numerical analysis
- [35L05](#) Wave equation
- [65M06](#) Finite difference methods for initial value and initial-boundary value problems involving PDEs

Cited in 1 Review Cited in 232 Documents

Keywords:

[finite volume methods](#); [hyperbolic conservation laws](#); [nonlinear stability](#); [textbook](#); [numerical examples](#)

Software:

[HLLE](#); [HE-E1GODF](#)