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Numerical methods for conservation laws with discontinuous coefficients. (English)

Zbl 1368.65156

Abgrall, Rémi (ed.) et al., Handbook on numerical methods for hyperbolic problems. Applied and modern issues. Amsterdam: Elsevier/North Holland (ISBN 978-0-444-63910-3/hbk; 978-0-444-63911-0/ebook). Handbook of Numerical Analysis 18, 479-506 (2017).

Summary: Conservation laws with discontinuous coefficients, such as fluxes and source terms, arise in a large number of problems in physics and engineering. We review some recent developments in the theory and numerical methods for these problems. The well-posedness theory for one-dimensional scalar conservation laws is briefly described, with a particular focus on the existence of infinitely many L^1 stable semigroups of solutions. We also present both aligned and staggered versions of finite volume methods to approximate systems of conservation laws with discontinuous flux. We conclude with some illustrative numerical experiments and a set of open questions.

For the entire collection see [Zbl 1364.65001].

MSC:

65M08	Finite volume methods for initial value and initial-boundary value problems involving PDEs	Cited in **4** Documents
35L65	Hyperbolic conservation laws	
35R05	PDEs with low regular coefficients and/or low regular data	
76S05	Flows in porous media; filtration; seepage	
76M12	Finite volume methods applied to problems in fluid mechanics	
90B20	Traffic problems in operations research	

Keywords:

conservation laws; discontinuous coefficients; finite volume methods; entropy solutions; numerical examples

Full Text: DOI