

**Karlsen, K. H.; Towers, J. D.**

**Convergence of the Lax-Friedrichs scheme and stability for conservation laws with a discontinuous space-time dependent flux.** (English) Zbl 1112.65085

Chin. Ann. Math., Ser. B 25, No. 3, 287-318 (2004).

The paper presents a convergence proof for the Lax-Friedrichs finite difference scheme in the context of non-convex genuinely nonlinear scalar conservation laws of the form

$$u_t + f(k(x, t), u)_x = 0,$$

where the coefficient  $k(x, t)$  is allowed to be discontinuous along curves in the  $(x, t)$  plane. It is shown that a convergent subsequence of approximations produced by the Lax-Friedrichs scheme converges to an entropy solution, implying that the entire computed sequence converges.

Reviewer: [Andreas Meister \(Kassel\)](#)

**MSC:**

**65M12** Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs

Cited in 54 Documents

**35L65** Hyperbolic conservation laws

**Keywords:**

[conservation laws](#); [Lax-Friedrichs scheme](#); [entropy condition](#); [compensated compactness](#); [nonconvex fluxes](#)

**Full Text:** [DOI](#)

**References:**

- [1] G. Q. Chen, Some Current Topics on Nonlinear Conservation Laws (Amer. Math. Soc., Providence, RI, 2000) pp. 33–75.
- [2] P. D. Lax, Contributions to Nonlinear Functional Analysis, ed. E. Zarantonello (Academic Press, New York, 1971) pp. 603–634.
- [3] L. Tartar, Nonlinear Analysis and Mechanics: Heriot-Watt Symposium IV (Pitman, Boston, Mass., 1979) pp. 136–212.
- [4] L. Tartar, Systems of Nonlinear Partial Differential Equations (Oxford, 1982), NATO Adv. Sci. Inst. Ser. C Math. Phys. Sci. 111 (Reidel, Dordrecht, 1983) pp. 263–285.

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.