

Harten, Ami; Lax, Peter D.; Levermore, C. David; Morokoff, William J.
Convex entropies and hyperbolicity for general Euler equations. (English) Zbl 0922.35089
SIAM J. Numer. Anal. 35, No. 6, 2117-2127 (1998).

The authors consider the compressible Euler equations that possess a family of generalized entropy densities of the form $\rho f(\sigma)$, where ρ is the mass density, σ is the specific entropy, and f is an arbitrary function. They determine which $\rho f(\sigma)$ are strictly convex for gases with an arbitrary equation of state. It is shown also that at every state with positive sound speed (i.e., where the Euler equations are hyperbolic) there exist strictly convex $\rho f(\sigma)$. This observation establishes the converse of the general fact that the existence of a strictly convex entropy density implies hyperbolicity.

Reviewer: [P.B.Dubovskii \(Moskva\)](#)

MSC:

- [35L60](#) First-order nonlinear hyperbolic equations
- [76N15](#) Gas dynamics, general
- [65M12](#) Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs

Cited in **1** Review
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Keywords:

[compressible Euler equations](#); [entropy solutions](#); [strictly convex entropy density](#)

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