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## Preface to the Fourth Edition

The purpose of this work is to present a broad overview of the theory of hyperbolic conservation laws, with emphasis on its genetic relation to classical continuum physics. The background, scope and plan are outlined in the Introduction, following this preface. The book was originally published fifteen years ago, and a third, revised edition appeared in 2010. Nevertheless, in order to keep pace with recent developments in the area, it has become necessary to prepare this substantially expanded and updated new edition.

In the face of the explosive growth of research, in volume, diversity and technical complexity, the encyclopedic ambitions of the project had to be moderated. Thus, a number of significant recent theoretical developments are barely touched upon here, or are merely sketched. For the same reason, it is not feasible to present the multitude of diverse applications that have mushroomed over the past few years. Still, the updated bibliography, now comprising close to two thousand entries, provides a panoramic view of the entire area.

The underlying objective of the work to promote synergy between the analysis of hyperbolic systems of conservation laws and continuum physics is particularly relevant at the present time, as the analytical theory is finally preparing the ground for taking up the challenge posed by systems in several spatial dimensions. The Euler equations of gas dynamics currently serve as the port of entry into that area of research. The new edition provides a brief account of recent developments in that direction and also strives to bring to the fore the noteworthy, albeit undeservedly neglected, paradigm of the system of elastodynamics.

The present edition places increased emphasis on the theory of hyperbolic systems of balance laws with dissipative source, modeling relaxation phenomena. The part of the theory pertaining to classical solutions in several spatial dimensions is expounded in the heavily revised and expanded Chapter V, while weak  $BV$  solutions in one spatial dimension are discussed in a newly added chapter (XVI).

A substantial portion of the original text has been reorganized so as to streamline the exposition, update the information, and enrich the collection of examples. In particular, several chapters of the latest edition have been expanded by the addition

of new sections, elaborating on previously raised issues or introducing new topics for discussion.

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