

1. Record Nr.	UNINA9910144585503321
Autore	Stadtke Herbert
Titolo	Gasdynamic aspects of two-phase flow [[electronic resource]] : hyperbolicity, wave propagation phenomena, and related numerical methods / / Herbert Stadtke
Pubbl/distr/stampa	Weinheim, : Wiley-VCH Chichester, : John Wiley [distributor], c2006
ISBN	1-280-72301-7 9786610723010 3-527-61024-3 3-527-60911-3
Descrizione fisica	1 online resource (289 p.)
Disciplina	532.051
Soggetti	Two-phase flow Gas dynamics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Gasdynamic Aspects of Two-Phase Flow; Contents; Preface; List of frequently used symbols; 1 Introduction; 2 Single-Phase Gas Flow; 2.1 Euler equations for one-dimensional flow; 2.2 Quasi-one-dimensional flow in ducts of variable cross section; 2.3 Characteristic analysis of flow equations; 2.4 Shock waves; 2.5 Flow through convergent-divergent nozzles; 2.6 Shock tube; 2.7 Multidimensional flow conditions; References; 3 Two-Fluid Model of Two-Phase Flow; 3.1 Balance equations of two fluid model of two-phase flow; 3.2 Single pressure two-fluid model; 3.3 Remarks on interfacial transfer terms References; 4 Simplified Two-Phase Flow Models; 4.1 Homogeneous equilibrium model; 4.1.1 Two-component two-phase flow; 4.1.2 One-component two-phase flow; 4.2 Homogeneous nonequilibrium two-phase flow; 4.3 Wallis model; References; 5 A Hyperbolic Model for Two-Phase Flow; 5.1 One-dimensional flow; 5.1.1 Interfacial momentum coupling terms; 5.1.2 Final form of conservation equations; 5.1.3 Characteristic analysis - eigenvalues; 5.1.4 Characteristic analysis - eigenvectors and splitting of coefficient matrix; 5.1.5 Homogeneous

flow conditions as a limiting case

5.1.6 Use of conservative variables5.1.7 Quasi-one-dimensional flow through channels of variable cross section; 5.2 Two-dimensional two-phase flow conditions; 5.2.1 Basic flow equations for two-dimensional flow; 5.2.2 Eigenvalues and split matrices; 5.2.3 Conservative form of flow equations; 5.3 Final remarks to the hyperbolic two-phase flow model; References; 6 Dispersion of Sound Waves; 6.1 Acoustic approximation of flow equations; 6.2 Dispersion analysis of gas-particle flows; References; 7 Numerical Methods for Hyperbolic Two-Phase Flow System Equations

7.1 Mathematical nature of two-phase flow equations7.2 Overview on hyperbolic numerical methods; 7.3 The Split Coefficient Matrix method; 7.4 Godunov methods and Approximate Riemann solver; 7.4.1 General Godunov approach; 7.4.2 The linearized Riemann solver; 7.4.3 The Roe solver; 7.5 Flux Vector Splitting method; References; 8 Remarks on the Advanced Two-Phase Flow Module; 8.1 Basic modeling approach; 8.1.1 Balance equations of two-fluid model; 8.1.2 Flow topology and interfacial area; 8.1.3 Algebraic source terms; 8.1.4 State properties; 8.2 Numerical method

8.2.1 Conservative form of flow equations8.2.2 Finite volume discretization; 8.2.3 Second-order accuracy; 8.2.4 Implicit time integration; References; 9 Numerical Results and Applications; 9.1 Phase separation and void waves; 9.1.1 Analytical model; 9.1.2 Numerical results; 9.2 U-tube oscillations; 9.2.1 Analytical solution; 9.2.2 Numerical results; 9.3 Pressure wave propagation phenomena; 9.3.1 Single-phase gas flow; 9.3.2 Two-phase flow; 9.4 Shock tube; 9.4.1 Single-phase gas; 9.4.2 Two-phase flow; 9.5 Multidimensional wave propagation and explosion phenomena; 9.5.1 Single-phase gas flow

9.5.2 Two-phase flow

Sommario/riassunto

Here, the author, a researcher of outstanding experience in this field, summarizes and combines the recent results and findings on advanced two-phase flow modeling and numerical methods otherwise dispersed in various journals, while also providing explanations for numerical and modeling techniques previously not covered by other books. The resulting systematic and comprehensive monograph is unrivaled in its kind, serving as a reference for both researchers and engineers working in engineering as well as in environmental science.
