1. Record Nr. UNINA9910453180003321

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Titolo	Mechanical and thermodynamical modeling of fluid interfaces [[electronic resource] /] / Renee Gatignol, Roger Prud'homme
Pubbl/distr/stampa	Singapore ; ; River Edge, N.J., : World Scientific, 2001
ISBN	1-281-95628-7 9786611956288 981-281-062-5
Descrizione fisica	1 online resource (273 p.)
Collana	Series on advances in mathematics for applied sciences ; ; v. 58
Altri autori (Persone)	Prud'hommeRoger
Disciplina	532
Soggetti	Liquid-liquid interfaces - Mathematical models Gas-liquid interfaces - Mathematical models Thermodynamics Electronic books.
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 (p. 239-248).
Nota di contenuto	PREFACE; CONTENTS; LIST OF SYMBOLS; 1. INTRODUCTION; 1.1. The concept of an ""interface""; 1.2. The concept of an ""interfacial layer""; 1.3. Presentation of the volume; 2. THERMODYNAMICS AND KINEMATICS OF INTERFACES; 2.1. Definition of surfaces; 2.2. Interfacial quantities; 2.3. Thermodynamic relations; 2.3.1. The bulk; 2.3.2. The interface; 2.3.3. Thermodynamic equilibrium between two phases at rest; 2.3.4. Surface tension out of equilibrium; 2.4. Velocities and deformation rates of the interface; 2.4.1. Material velocities in the bulk; 2.4.2. Interfacial velocities in intrinsic description 2.4.3. Velocities in orthogonal curvilinear coordinates2.4.4. Strain rates; 2.4.5. Transport theorem for a curvilinear integral; 2.4.6. Transport theorem for a surface integral; 2.4.7. Divergence theorem on a surface; 2.4.8. Interfacial fluxes; 2.5. Examples; 2.5.1. Effect of curvature on surface integrals; 2.5.2. Parallel curves; 2.5.3. Parallel surfaces; 2.5.4. Effect of curvature on lateral surface integrals in the case of parallel surfaces; 2.5.5. Effect of curvature on equilibrium surface tension; 2.5.6. Determination of the mean normal curvature; 2.5.7. Deformation along a surface

2.5.8. Stretch of a moving cylinder2.5.9. Stretch of a planar flame; 3. INTERFACE BALANCE LAWS; 3.1. General interface balance law; 3.1.1. Balance law for the three-dimensional continuum; 3.1.2. First integration method of the local balance laws for the three-dimensional continuum; 3.1.3. Second integration method of the balance laws for the three-dimensional continuum; 3.1.4. Some comments; 3.2. Interface balance laws for species, mass, momentum and energy; 3.2.1. Interface balance laws for species; 3.2.2. Interface balance law for mass; 3.2.3. Momentum interface balance law
3.2.4. Energy interface balance law3.3. Interfacial entropy production; 3.3.1. Interfacial entropy inequality; 3.3.2. Interface Clausius-Duhem inequality; 3.3.3. Balance laws for an interface inside one component fluids; 3.3.4. A remark for the interfaces without mass; 4. CONSTITUTIVE RELATIONS DEDUCED FROM LINEAR IRREVERSIBLE THERMODYNAMICS FOR TWO-DIMENSIONAL INTERFACES; 4.1. Analysis of the surface entropy production and possible coupling; 4.2. Capillarity at equilibrium; 4.3. Newtonian interface and surface viscosities; 4.3.1. Benard-Marangoni effect; 4.3.2. Surface viscosities
4.4. Surface heat transfer4.5. Problems related to evaporation / condensation; 4.5.1. Plane interface case; 4.5.2. Curvature effect; 4.6. Surface chemical reactions; 4.7 Interfaces without mass; 5. CLASSICAL THREE-DIMENSIONAL CONSTITUTIVE RELATIONS DEDUCED FROM LINEAR IRREVERSIBLE THERMODYNAMICS AND THEIR CONSEQUENCES FOR INTERFACES; 5.1. Constitutive relations of three-dimensional classical fluid mixtures; 5.2. The case of premixed flames with high activation energy; 5.2.1. The classical theory of planar adiabatic premixed flames
5.2.2. Curved premixed flames with high activation energy for Lewis number near unity

Sommario/riassunto

This book constitutes a comprehensive survey of the balance equations for mass, momentum and energy for the interfaces in pure fluids and mixtures. Constitutive laws are presented for many situations in engineering science, and examples are provided, including surface viscosity effects, variable surface tension and vapor recoil. In addition, some extensions of existing theory are given: stretch effect in premixed flames, relaxation zones downstream two-phase shock waves, and effective surface tension for steep gradient zones. Contents: Thermodynamics and Kinematics of Interfaces; Interface Bal