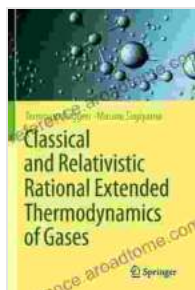


# Classical and Relativistic Rational Extended Thermodynamics of Gases: Unveiling the Microscopic Foundations of Gases

Classical and relativistic rational extended thermodynamics of gases provides a comprehensive framework for describing the thermodynamic behavior of gases, encompassing both classical and relativistic scenarios. This book, "Classical and Relativistic Rational Extended Thermodynamics of Gases," delves into the intricate relationships between macroscopic and microscopic properties of gases, laying the theoretical foundations for understanding their behavior across a wide range of conditions.

## Classical Rational Extended Thermodynamics

The first part of the book focuses on classical rational extended thermodynamics, which serves as the theoretical backbone for describing the macroscopic behavior of gases. It delves into the concepts of rational extended thermodynamics, outlining its fundamental principles and assumptions. This framework allows for the systematic derivation of constitutive equations that accurately capture the thermodynamic properties of gases, enabling researchers to model their behavior under varying conditions.



## Classical and Relativistic Rational Extended Thermodynamics of Gases

★★★★★ 5 out of 5

Language : English

File size : 16368 KB

Print length: 701 pages



## **Microscopic Foundations**

A crucial aspect of this approach lies in establishing the microscopic foundations of rational extended thermodynamics. The book explores the connection between macroscopic quantities and microscopic variables, providing a rigorous framework for bridging the gap between the macroscopic and microscopic realms. This enables researchers to gain a deeper understanding of the underlying mechanisms governing the thermodynamic behavior of gases.

## **Applications to Non-Equilibrium Phenomena**

Rational extended thermodynamics finds extensive applications in the study of non-equilibrium phenomena in gases. The book showcases the framework's ability to model complex gas dynamics, such as shock waves, rarefied gas flows, and chemically reacting flows. By accounting for non-equilibrium effects, researchers can gain valuable insights into the intricate interplay between microscopic processes and macroscopic gas behavior.

## **Relativistic Rational Extended Thermodynamics**

The second part of the book ventures into the realm of relativistic rational extended thermodynamics, extending the theoretical framework to encompass high-speed gas dynamics. This approach provides a rigorous treatment of relativistic effects on the thermodynamic properties of gases, which become increasingly important as velocities approach significant fractions of the speed of light.

## **Covariant Formulation**

One of the key aspects of relativistic rational extended thermodynamics is its covariant formulation. The book introduces the covariant form of constitutive equations, ensuring the theory's validity in all inertial reference frames. This covariant approach enables researchers to describe relativistic gas dynamics in a consistent and physically meaningful manner.

## **Applications in Astrophysics and High-Energy Physics**

Relativistic rational extended thermodynamics finds important applications in astrophysics and high-energy physics, where relativistic effects play a dominant role. The book explores the framework's use in modeling phenomena such as supernova explosions, neutron star mergers, and particle collisions. By incorporating relativistic effects, researchers can gain a comprehensive understanding of the thermodynamic behavior of gases in these extreme environments.

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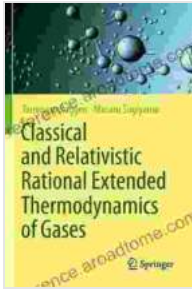
"Classical and Relativistic Rational Extended Thermodynamics of Gases" provides a comprehensive and in-depth exploration of the theoretical foundations and applications of rational extended thermodynamics for gases. It offers a rigorous framework for understanding the thermodynamic behavior of gases across a wide range of conditions, from classical to relativistic regimes. This book serves as an invaluable resource for researchers and practitioners in the fields of thermodynamics, gas dynamics, astrophysics, and high-energy physics.

## **Classical and Relativistic Rational Extended Thermodynamics of Gases**

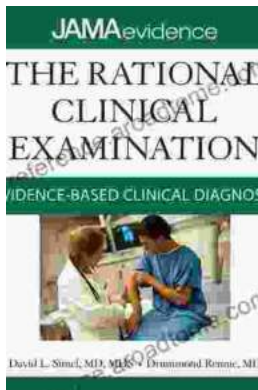
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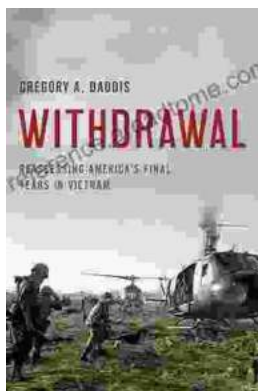


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