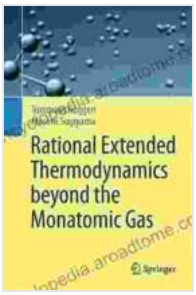
Rational Extended Thermodynamics Beyond The Monatomic Gas

Rational Extended Thermodynamics Beyond The Monatomic Gas is a comprehensive treatise on the subject, providing a unified framework for the analysis of thermodynamic systems and processes. The book begins with a review of the fundamental concepts of thermodynamics, then develops the theory of rational extended thermodynamics, which is a generalization of classical thermodynamics to systems with internal degrees of freedom. The book then applies the theory to a wide range of problems, including the behavior of fluids, solids, and mixtures.



Rational Extended Thermodynamics beyond the Monatomic Gas

★★★★★ 5 out of 5

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Thermodynamics is a branch of physics that deals with the relationships between heat and other forms of energy. It is a fundamental science that has applications in many fields, including engineering, chemistry, and biology. Classical thermodynamics is based on the laws of thermodynamics, which are empirical laws that have been found to be universally true. However, classical thermodynamics is only applicable to systems that are in equilibrium. For systems that are not in equilibrium, a more general theory is needed.

Rational extended thermodynamics is a generalization of classical thermodynamics to systems with internal degrees of freedom. It is based on the principle of maximum entropy production, which states that the entropy of a system will always increase over time. Rational extended thermodynamics can be used to analyze a wide range of problems, including the behavior of fluids, solids, and mixtures.

Fundamental Concepts of Thermodynamics

The fundamental concepts of thermodynamics are the laws of thermodynamics. The first law of thermodynamics states that the total energy of a system is constant. The second law of thermodynamics states that the entropy of a system will always increase over time. The third law of thermodynamics states that the entropy of a perfect crystal at absolute zero is zero.

In addition to the laws of thermodynamics, there are a number of other important concepts in thermodynamics, including:

- Temperature
- Pressure
- Volume
- Entropy
- Enthalpy
- Free energy

Rational Extended Thermodynamics

Rational extended thermodynamics is a generalization of classical thermodynamics to systems with internal degrees of freedom. It is based on the principle of maximum entropy production, which states that the entropy of a system will always increase over time. Rational extended thermodynamics can be used to analyze a wide range of problems, including the behavior of fluids, solids, and mixtures.

The basic principles of rational extended thermodynamics are as follows:

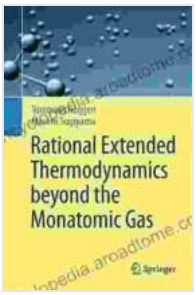
- The entropy of a system is always increasing.
- The entropy production of a system is always non-negative.
- The entropy production of a system is a function of the state of the system and the external forces acting on the system.

Rational extended thermodynamics can be used to derive a number of important relationships, including the equations of state for fluids, solids, and mixtures. It can also be used to analyze the behavior of systems that are not in equilibrium.

Applications to Fluids

Rational extended thermodynamics has been used to successfully analyze a wide range of problems in fluid mechanics. These include:

- The behavior of fluids in pipes
- The flow of fluids in porous media



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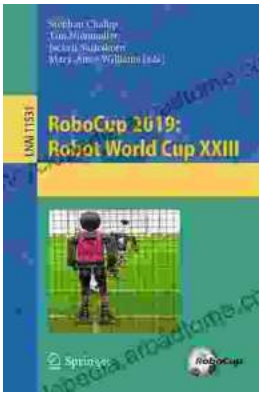

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