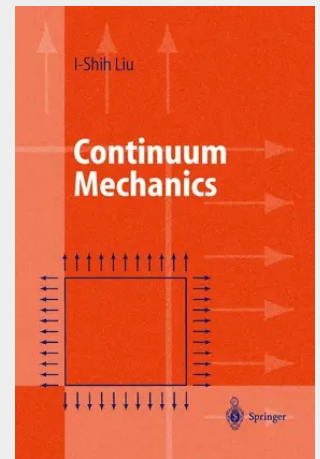


Continuum Mechanics

In this book the basic principles of continuum mechanics and thermodynamics are treated in the tradition of the rational framework established in the 1960s, typically in the fundamental memoir "The Non-Linear Field Theories of Mechanics" by Truesdell and Noll. The theoretical aspect of constitutive theories for materials in general has been carefully developed in mathematical clarity - from general kinematics, balance equations, material objectivity, and isotropic representations to the framework of rational thermodynamics based on the entropy principle. However, I make no claim that the subjects are covered completely, nor does this book cover solutions and examples that can usually be found in textbooks of fluid mechanics and linear elasticity. However, some of the interesting examples of finite deformations in elastic materials, such as biaxial stretching of an elastic membrane and inflation of a rubber balloon, are discussed. In the last two chapters of the book, some recent developments in thermodynamic theories are considered. Specifically, they emphasize the use of Lagrange multipliers, which enables the exploitation of the entropy principle in a systematic manner for constitutive equations, and introduce some basic notions of extended thermodynamics. Although extended thermodynamics is closely related to the kinetic theory of ideal gases, very limited knowledge of kinetic theory is needed.

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