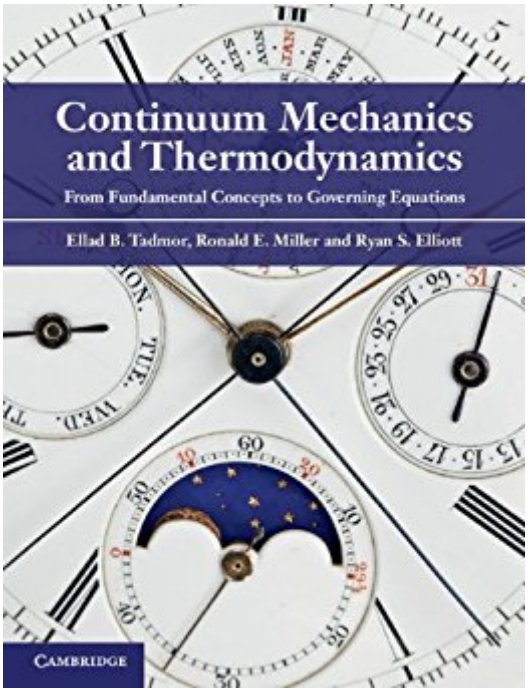
Continuum Mechanics And Thermodynamics



Synopsis

Continuum mechanics and thermodynamics are foundational theories of many fields of science and engineering. This book presents a fresh perspective on these fundamental topics, connecting micro- and nanoscopic theories and emphasizing topics relevant to understanding solid-state thermo-mechanical behavior. Providing clear, in-depth coverage, the book gives a self-contained treatment of topics directly related to nonlinear materials modeling. It starts with vectors and tensors, finite deformation kinematics, the fundamental balance and conservation laws, and classical thermodynamics. It then discusses the principles of constitutive theory and examples of constitutive models, presents a foundational treatment of energy principles and stability theory, and concludes with example closed-form solutions and the essentials of finite elements. Together with its companion book, Modeling Materials, (Cambridge University Press, 2011), this work presents the fundamentals of multiscale materials modeling for graduate students and researchers in physics, materials science, chemistry and engineering.

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Customer Reviews

Continuum mechanics and thermodynamics are foundational theories of many fields of science and engineering. This book presents a fresh perspective on these important subjects, exploring their fundamentals and connecting them with micro- and nanoscopic theories. Providing clear, in-depth coverage, this book shows a self-contained treatment of topics directly related to nonlinear materials modeling through emphasizing topics relevant to understanding solid-state thermo-mechanical behavior.Together, continuum mechanics and thermodynamics form the fundamental theory lying at the heart of many disciplines in science and engineering.It starts with vectors and tensors, finite deformation kinematics, the fundamental balance and conservation laws, and classical thermodynamics. It then discusses the principles of constitutive theory and examples of constitutive models, presents a foundational treatment of energy principles and stability theory, and concludes with example closed-form solutions and the essentials of finite elements.This is a nonlinear theory dealing with the macroscopic response of material bodies to mechanicaland thermal loading. First, rather than just presenting equations, they attempt to explain where the equations come from and what are the underlying assumptions. This is important for those seeking to integrate continuum mechanics within a multiscale paradigm, but is also of great value for those who seek to master continuum mechanics on its own, and ever for experts who wish to reflect further upon the basis of their field and its limitations. To this end, they havedeveloped the subject in a step-by-step fashion, building up from fundamental ideas and concepts to more complex principles.

Mechanics in Highway Engineering (Series on Rock and Soil Mechanics) Mechanics II: Mechanics of Materials + Not for Specialists: New and Selected Poems (American Poets Continuum) Bowden Children and Their Families: The Continuum of Nursing Care Set Theory and the Continuum Problem (Dover Books on Mathematics)