Continuum Thermomechanics

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Monografía

This book is intended to be an extension of Gurtins book on continuum mech- ics [5] by including the laws of thermodynamics and thus making it possible to study the mechanical behaviour of material bodies, the response of which involves variables such as entropy or temperature. In order to do that our departure point is Coleman and Nolls article [3] on the thermodynamics of elastic materials with heat conduction and viscosity which has been extended for the purpose at hand to the case of nonhomogeneous materials. The present book has been used for many years as a textbook for gra- ate and undergraduate mathematics students at the University of Santiago de Compostela. The ?rst Chapter revisits the conservation principles of continuum ther- mechanics, thatis,theconservationofmass,linearandangularmomentumbalance and the ?rst two principles of thermodynamics: namely, energy conservation and entropy inequality. All principles are introduced in integral form and in Eulerian coordinates. Local forms consisting of partial di?erential equations are then - tained. Writing these local equations in Lagrangian coordinates is the subject of Chapter 2. Chapter 3 deals with the constitutive laws of continuum thermomechanics. First the notion of a material body characterised by its constitutive class is given

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