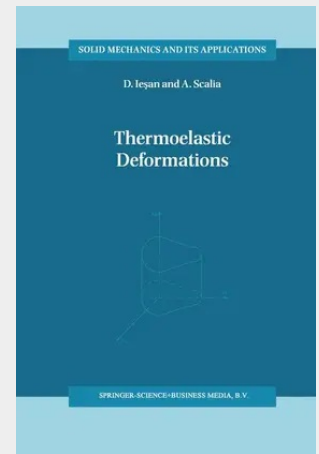


Thermoelastic Deformations

The theory of thermoelasticity studies the interaction between thermal and mechanical fields in elastic bodies. This theory is of interest both for the mathematical and technical point of view. Intense interest has been shown recently in this field owing to the great practical importance of dynamical effects in aeronautics, nuclear reactors, and its potential importance in cryogenic applications. This work is concerned mainly with basic problems of the theory of thermoelasticity. Thermoelasticity of polar materials and the theories of thermoelasticity with finite wave speeds are not considered here. The reader interested in these subjects will find a full account in the works of Nowacki [280], Chandrasekhariah [60] and Ignaczak [195]. Our purpose in this work is to present a systematic treatment of some results established in the theory of thermoelasticity. On the whole, the subject matter is directed towards recent developments. Chapter 1 is concerned mainly with the development of the fundamental equations of the theory of thermoelasticity. The kinematics and primitive concepts associated with the basic principles are developed and emphasized only to the extent that they are needed in our treatment of the subject. Chapter 2 is devoted to a study of linear thermoelastic deformations for prestressed bodies. We have attempted to isolate those conceptual and mathematical difficulties which arise over and above those inherent in the problems concerned with unstressed bodies.

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