overcoming possible notational barriers. No solutions of specialized
technical problems are presented. Instead, the essentials of
the theory are developed, beginning with tensor analysis, elements
of potential theory, then moving to kinematics, dynamics, and the
constitutive relation in linear elasticity, at each stage giving rigor­
ous proofs for a large body of relevant assertions. Then a long
chapter in elastostatics and another in elasto-dynamics complete
this work which can serve as an excellent text for applied mathe­
maticians interested in elasticity, and as a solid reference book
with an extensive list of references for the practitioners.

Linear Thermoelasticity by Donald E. Carlson; pp. 297-345 (re­
viewed by S.N.N.). This part follows the style of the previous arti­
cle, giving fundamentals in thermoelasticity, again avoiding solu­
tions to technical problems. It is less ambitious than Gurtin’s arti­
cle, but scholarly done. While this reviewer finds it a welcome ad­
dition to the literature, he feels that the use of the questionable
Clausius-Duhem inequality in the unquestionable classical theory
of thermoelasticity is unnecessary.

Existence Theorems in Elasticity and Boundary-Value Prob­
lems of Elasticity With Unilateral Constraints by Gaetano Fich­
era; pp. 347-424 (reviewed by W.R.O.). These two articles are rec­
ommended to those who have a good background in modern math­
ematical analysis. A substantial portion of the first article is devout­
ed to key theorems on the existence and uniqueness of solutions to
linear boundary-value problems involving strongly elliptic opera­
tors. Applications of these results are given for some classical prob­
lems in linear elasticity with bilateral constraints. The second arti­
cle extends the analysis of the first article so as to treat problems
with unilateral (i.e., inequality) constraints. General results are de­
developed for the abstract unilateral problem in cases of both sym­
metric and nonsymmetric operators. Applications of these results
include the famous Signorini Problem.

The Theory of Shells and Plates by P. M. Naghdi; pp. 425-640
(reviewed by S.N.N.). Field equations relating to elastic plates
and shells are developed by two parallel methods. The first, called
direct, views the shell as a deformable two-dimensional surface
embedded in three-dimensional Euclidean space. A deformable vector
called director is assigned at each point of the surface. The
kinematics of this model is developed, then dynamics is discussed by
the introduction of contact (internal) force and director couple,
and an additional vector called intrinsic director couple, taking
due account of invariance under rigid rotation. Balance equations
are postulated; and their local forms are obtained. Finally, for elas­
tic shells, the free energy is expressed in terms of surface deforma­
tion measures, the director, and its surface gradient, temperature,
etc. The use of the Clausius-Duhem inequality gives dynamical
currents that are analytic; no attempt is made to establish
convergence rates, and truncation errors.

Nonlinear and Random Vibrations, By F. Dincu and C. Teodosiu.

REVIEWED BY T. T. SOONQs

The book, an English version of the 1970 Romanian edition, is
devoted to the study of vibrational properties of one-degree-of­
freedom systems governed by

\[ \ddot{x} + f(x) + g(x) = p(t) \]

It is divided into three parts. The first two parts deal with free
and forced deterministic vibrations of nonlinear systems and rep­
resent a good and comprehensive treatment of the subject. Both
qualitative and quantitative aspects of the problem are extensively
discussed. The reader will also find in these two parts a good compi­
ation of methods of solution with applications to the study of conser­
vative systems as well as dissipative systems. Another nice feature
is that some of the work done by the authors and their Roman­
ian colleagues appear here for the first time in English.

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