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★**Treatise on classical elasticity.**

Theory and related problems.

Mathematical and Analytical Techniques with Applications to Engineering.

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This presentation of classical (that is, linear) elasticity is a treatise in the true sense in that it covers the entire subject—I could not spot any omitted topics. It develops the subject from the ground up; the only prerequisites are a good mastery of multivariable calculus and elementary physics.

Each chapter begins with a review of the relevant history supplemented with more than the customary number of bibliographic references. Special attention is given to the Eastern European, especially Romanian, authors, whose work tends to receive less attention than they deserve in the books authored in the West. Chapter 1 presents an informative 14-page overview of the history of the subject.

Chapters 2 and 3 (pages 33 through 113) develop the basic notions of stress, strain, and constitutive equations, and derive the equations of motion. The level of the exposition is between that of an engineering 'strength of materials' textbook and an 'elasticity for the mathematician' treatise such as M. E. Gurtin's monograph [in *Handbuch der Physik. Band VIa/2*, 1–295, Springer, Berlin, 1972; see MR0347187 (49 #11907)].

Constitutive equations are introduced in Chapter 4, first for the isotropic case, then for general elastic materials. Going beyond the routine, this chapter also introduces constitutive equations for thermoelastic, plastic, and viscoelastic materials.

Chapter 5 is on the potential function representations of the deformations and stresses. Here we encounter not only well-known representations such as those of Maxwell, of Papkovitch and Neuber, and of Beltrami and Mitchell, but also somewhat obscure ones such as those of Teodorescu and of Somigliana and Iacovache. Both static and dynamic cases are considered.

Chapter 6 introduces work and energy theorems, variational principles, Saint-Venant's principle, Fourier series, harmonic and biharmonic functions, and fundamental solutions for the isotropic case.

Chapter 7 is on Cosserat-type materials (also known as *polar materials*) which extend traditional elasticity by introducing moments that act on points. Among many consequences is the loss of symmetry of the stress. Various potential function representations are introduced here as well. This chapter is a valuable addition to the elasticity literature; I don't know of another place where this information is gathered and presented as systematically as this.

Chapters 8 through 11 present special solutions of static equilibrium problems, both in regular elasticity and in materials of Cosserat-type. Examples include concentrated forces and couples acting on an elastic half-space, and distributed tractions acting on a quarter-space and an eighth-space.

Chapters 12 through 16 are collections of miscellaneous topics, including wave propagation, anisotropy, thermoelasticity, and viscoelasticity.

In the capsule summary of the book's contents above, I have focused on its positive and unique aspects. I will be remiss, however, if I fail to point out some of its shortcomings:

(1) Some of the notation is not standard. On page 103, for instance, the Cauchy stress vector is expressed through the monstrosity:

$$\overset{n^*}{\mathbf{p}}{}^* = \frac{d\overset{n^*}{\mathbf{P}}{}^*}{dA^*}.$$

(2) Sometimes the overly convoluted sentences get in the way of the comprehension of the material.
(3) In places the book has the flavor of a machine-translated text.

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