

Theory of Elasticity for Scientists and Engineers

By Teodor M. Atanackovic, Ardeshir Guran

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This book is intended to be an introduction to elasticity theory. It is assumed that the student, before reading this book, has had courses in mechanics (statics, dynamics) and strength of materials (mechanics of materials). It is written at a level for undergraduate and beginning graduate engineering students in mechanical, civil, or aerospace engineering. As a background in mathematics, readers are expected to have had courses in advanced calculus, linear algebra, and differential equations. Our experience in teaching elasticity theory to engineering students leads us to believe that the course must be problem-solving oriented. We believe that formulation and solution of the problems is at the heart of elasticity theory. Of course orientation to problem-solving philosophy does not exclude the need to study fundamentals. By fundamentals we mean both mechanical concepts such as stress, deformation and strain, compatibility conditions, constitutive relations, energy of deformation, and mathematical methods, such as partial differential equations, complex variable and variational methods, and numerical techniques. We are aware of many excellent books on elasticity, some of which are listed in the References. If we are to state what differentiates our book from other similar texts we could, besides the already stated problem-solving orientation, list the following: study of deformations that are not necessarily small, selection of problems that we treat, and the use of Cartesian tensors only.

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Bibliography

- Sales Rank: #4744228 in Books
- Published on: 2000-06-16
- Original language: English
- Number of items: 1
- Dimensions: 9.21" h x .88" w x 6.14" l, 1.52 pounds
- Binding: Hardcover
- 374 pages

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"...the layout is pleasant, the figures are well drawn; and equations, numbered separately by chapter, are appropriately separated and easily read. The book succeeds in its stated aim of providing a basic, yet sufficiently comprehensive text in elasticity. It is considered very suitable as a senior course for students who have either a major interest or sufficient curiosity in the basics of continuum mechanics."

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