An Introduction to Nonlinear Finite Element Analysis

By J. N. Reddy

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This book presents the theory and computer implementations of the finite element method as applied to nonlinear problems of heat transfer and similar field problems, fluid mechanics (flows of incompressible fluids), and solid mechanics (elasticity, beams and plates). Both geometric as well as material nonlinearities are considered, and static and transient (i.e.: time-dependent) responses are studied. Although there exist a number of books on nonlinear finite elements that serve as good references for engineers who are familiar with the subject and wish to learn advanced topics or the latest developments, there is currently no book which is suitable as a textbook for a first course on nonlinear finite element analysis. This book fills the void in the market, providing a clear understanding of the concepts of nonlinear finite element analyses through detailed theoretical formulations and computer implementation steps, examples and exercises. In addition, the book serves as a prelude to more advanced books on the subject.

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Editorial Review

Review

"...J.N. Reddy has captured the essence of the field of nonlinear continuum mechanics in this textbook. The potential readership would be graduate students and researchers involved in constructing solutions to problems inherent to the nonconservative world, and there are many of these problems out there."--*AAIA Journal*

About the Author

Junuthula Narasimha Reddy is Distinguished Professor and inaugural holder of the Oscar S. Wyatt Endowed Chair in the Department of Mechanical Engineering at Texas A&M University.

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