

Solid Mechanics: A Variational Approach, Augmented Edition

By Clive L. Dym, Irving H. Shames

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Solid Mechanics: A Variational Approach, Augmented Edition presents a lucid and thoroughly developed approach to solid mechanics for students engaged in the study of elastic structures not seen in other texts currently on the market. This work offers a clear and carefully prepared exposition of variational techniques as they are applied to solid mechanics. Unlike other books in this field, Dym and Shames treat all the necessary theory needed for the study of solid mechanics and include extensive applications. Of particular note is the variational approach used in developing consistent structural theories and in obtaining exact and approximate solutions for many problems. Based on both semester and year-long courses taught to undergraduate seniors and graduate students, this text is geared for programs in aeronautical, civil, and mechanical engineering, and in engineering science. The authors' objective is two-fold: first, to introduce the student to the theory of structures (one- and two-dimensional) as developed from the three-dimensional theory of elasticity; and second, to introduce the student to the strength and utility of variational principles and methods, including briefly making the connection to finite element methods. A complete set of homework problems is included.

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Editorial Review

Review

From the reviews:

“The book is written for senior and first year graduate students wishing to study variational methods as applied to solid mechanics. These methods are extremely useful as means of properly formulating boundary value problems, and also as means of finding approximate analytical solutions to these boundary value problems.” (Ján Sládek, zbMATH, Vol. 1279, 2014)

“Dym (Harvey Mudd College) and Shames … are well known in the mechanics community. … Their new book is well written, well organized, clear, and very readable. The content, on the variational formulation of solid mechanics, is important as it underlies all finite element formulations. … The numerous end-of-chapter exercises make the book very suitable for first- or second-year graduate students in mechanical/aeronautical/structural engineering. … Summing Up: Recommended. Graduate students and above.” (J. Lambropoulos, Choice, Vol. 51 (3), November, 2013)

From the Back Cover

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In summary, this book:

Emphasizes and articulates the variational calculus approach to both formulating and solving mechanics problems

Briefly introduces finite element method in the context of variational approaches to modeling and solving mechanics and structures problems

Accessible to engineering students while maintaining mathematical correctness

Presents extensive worked-out examples in the text and homework problems

Includes instructors' solutions manual and over 200 illustrations

About the Author
Dr. Clive L. Dym is Fletcher Jones Professor of Engineering Design and Director of the Center for Design Education at Harvey Mudd College. His research concerns engineering design and structural mechanics. He holds a PhD from Stanford.

Professor Irving Shames received his Ph.D from the University of Maryland in 1953 and held faculty positions at the University of Maryland, Stevens Institute of Technology, Pratt Institute, the State University of NewYork at Buffalo, and, most recently, George Washington University.

Users Review

From reader reviews:

Gail Kernan:

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