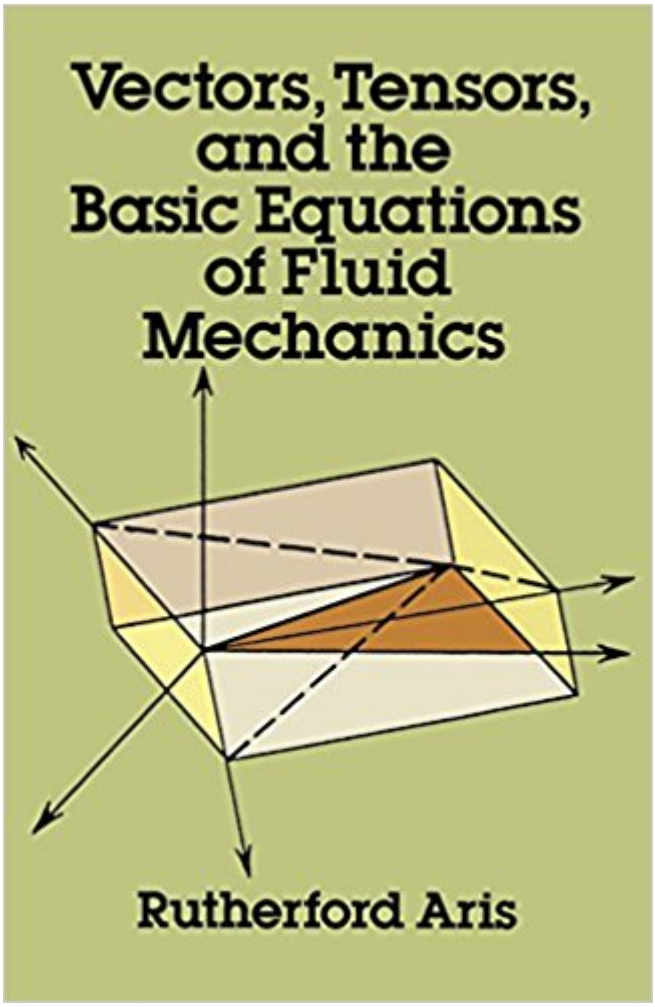
Vectors, Tensors And The Basic Equations Of Fluid Mechanics (Dover Books On Mathematics)



Synopsis

This excellent text develops and utilizes mathematical concepts to illuminate physical theories. Directed primarily to engineers, physicists, and applied mathematicians at advanced undergraduate and graduate levels, it applies the mathematics of Cartesian and general tensors to physical field theories and demonstrates them chiefly in terms of the theory of fluid mechanics.Essentially an introductory text, intended for readers with some acquaintance with the calculus of partial differentiation and multiple integration, it first reviews the necessary background material, then proceeds to explore the algebra and calculus of Cartesian vectors and tensors. Subsequent chapters take up the kinematics of fluid motion, stress in fluids, equations of motion and energy in Cartesian coordinates, tensors, and equations of fluid flow in Euclidean space.The concluding chapters discuss the geometry of surfaces in space, the equations of surface flow and equations for reacting fluids. Two invaluable appendixes present a resume of 3-dimensional coordinate geometry and matrix theory and another of implicit functions and Jacobians. A generous number of exercises are an integral part of the presentation, providing numerous opportunities for manipulation and extension of the concepts presented.

Book Information

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Customer Reviews

Very good book, enjoyed the tensor approach and found it illuminating. The book is not as much about the standard solutions to fluid problems (lubrication, creeping flow, boundary layer etc) as it is about the basic equations and how they can be applied with changing basis vectors, on surfaces,

etc.

Used it in Fluid mechanics class long time ago. I used library copy of the book then. Now I have my own copy. A very important addition to my library.

This is a well written book and I would recommend it to anyone who is considering or going into some Fluid mechanics classes, or just needs to know more about the science of it.

great price

Nice book with cheap price.

ok

This would make a good introduction to tensors for physics students (e.g. for General Relativity), though the approach is a completely classical, using index notation; you won't find anything on manifolds or differential forms here. An interesting feature is an extensive chapter on local surface theory (e.g. Gaussian curvature, but only after introducing the full Riemann tensor), which is good for building intuition about curvature in higher dimensions. While the applications are all in n

Excellent book that gives a nice mathematical review in the first chapter before diving into the technical stuff. Overall a good read but a bit skimpy on examples. Derivations can be hard to follow with the outdated notation though.

Mathematics) Numerical Partial Differential Equations: Conservation Laws and Elliptic Equations (Texts in Applied Mathematics) (v. 33) Computational Fluid Mechanics and Heat Transfer, Third Edition (Series in Computational and Physical Processes in Mechanics and Thermal Sciences) Computational Fluid Mechanics and Heat Transfer, Second Edition (Series in Computional and Physical Processes in Mechanics and Thermal Sciences) Mathematics for Quantum Mechanics: An Introductory Survey of Operators, Eigenvalues, and Linear Vector Spaces (Dover Books on Mathematics) Biofluid Mechanics, Second Edition: An Introduction to Fluid Mechanics, Macrocirculation, and Microcirculation (Biomedical Engineering) Tensors in mechanics and elasticity (Engineering physics; an international series of monographs) Partial Differential Equations for Scientists and Engineers (Dover Books on Mathematics) An Introduction to Differential Equations and Their Applications (Dover Books on Mathematics) Ordinary Differential Equations (Dover Books on Mathematics) Hilbert Space Methods in Partial Differential Equations (Dover Books on Mathematics) Basic Fluid Mechanics (Stick Figure Physics Tutorials)