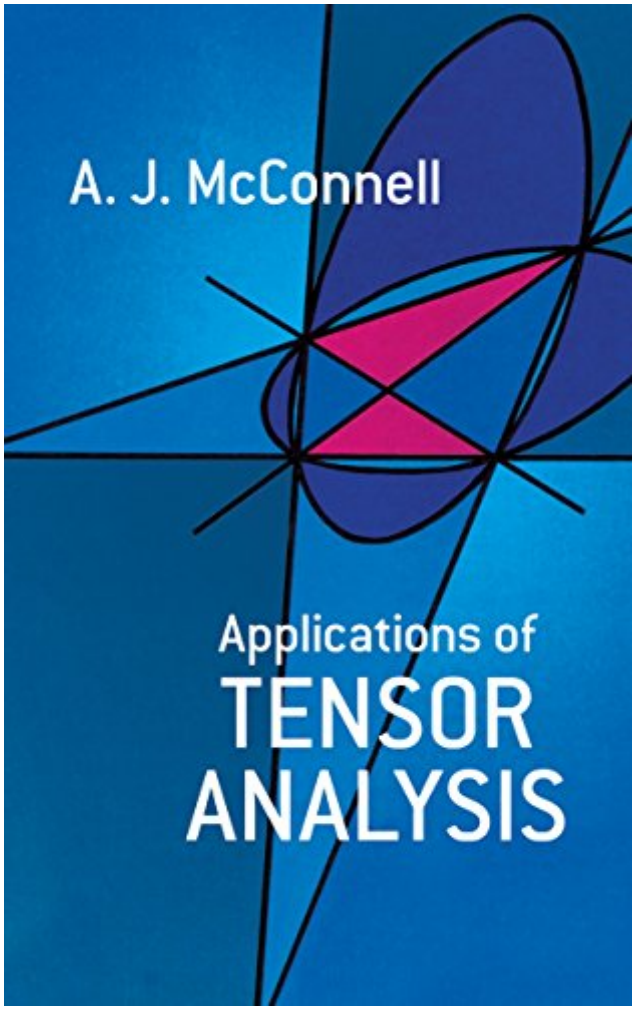
Applications Of Tensor Analysis (Dover Books On Mathematics)



Synopsis

This standard work applies tensorial methods to subjects within the realm of advanced college mathematics. In its four main divisions, it explains the fundamental ideas and the notation of tensor theory; covers the geometrical treatment of tensor algebra; introduces the theory of the differentiation of tensors; and applies mathematics to dynamics, electricity, elasticity, and hydrodynamics.Partial contents: algebraic preliminaries (notation, definitions, determinants, tensor analysis); algebraic geometry (rectilinear coordinates, the plane, the straight line, the quadric cone and the conic, systems of cones and conics, central quadrics, the general quadric, affine transformations); differential geometry (curvilinear coordinates, covariant differentiation, curves in a space, intrinsic geometry of a surface, fundamental formulae of a surface, curves on a surface); applied mathematics (dynamics of a particles, dynamics of rigid bodies, electricity and magnetism, mechanics of continuous media, special theory of relativity).

Book Information

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Customer Reviews

Wow, this was a great text. As an introduction, I am a health care professional whose math in college really only consisted of multi-variable calculus, differential equations, linear algebra, and

statistics. I’m studying tensors to follow Relativity mathematically (and it might just be useful for some research projects I’m involved with). To that end, I’m looking for clear, easy books teaching me tensor analysis.This book is a nice one. Although written in the 1930s, it is surprisingly clear. Concise. McConnell conveys things in simple, direct terms that make concepts so obvious what others can’t ever get around to saying.Much of it may be that unlike many books on tensors, McConnell doesn’t jump into affine transformations or elasticity applications-- he starts with tensors in rectilinear coordinates, the plane, the straight line. Concepts that for me were so well-understood/ingrained they were intuitive. Then, how tensors made complex calculations in these settings simple. How powerful tensors are!He transitioned to cones and quadrics. Then curves, surfaces, rigid bodies. Finally applications. Electricity and Magnetism, stress analysis, some fluid dynamics. Lastly, Special Relativity. It effectively builds you to this point.Drawbacks? It was so succinct, that in a few places I didn’t completely understand (more likely a lack of background for fluid dynamics, for example), it was hard to figure out why/where the deficit was coming from. Few answers to problems despite claiming otherwise. And no real look at tensors in gravitation theory beyond Special Relativity.For such a short book, very helpful.

For engineers and scientists who must model and analyze complex physical systems, here in one volume is a timeless (written in 1931), fresh, authoritative, clear, and well organized treatment of tensor analysis. McConnell gives a terse (318 page) treatment of the very useful but abstract discipline of tensor analysis. This treatment presents first principles and consists of applications to geometry (both algebraic and differential). What makes this text special is the wide range of applications to subjects in physics and engineering: dynamics of particles, dynamics of rigid bodies (my current interest), electricity and magnetism, mechanics of continuous media, and the special theory of relativity. This book was required reading for the graduate courses that I took in fluid mechanics. I recommend it very highly!

It is an excellent text on learning tensors. Tensor analysis is not a an easy topic and for me it is counter intuitive. However, that just might be me. I recommend this book very highly.

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