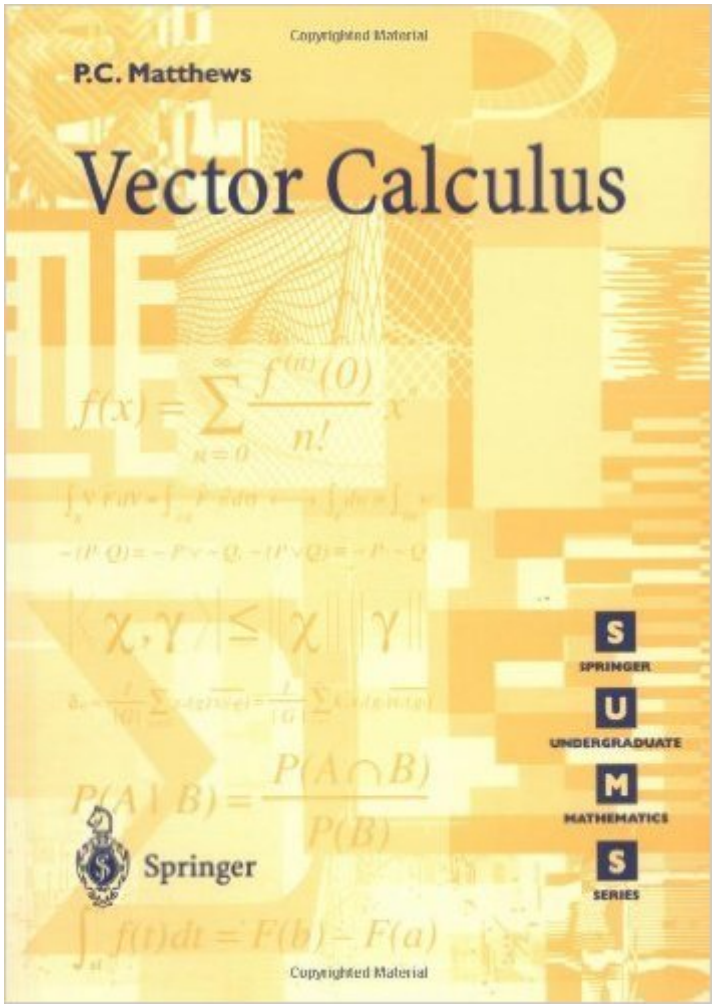
Vector Calculus (Springer Undergraduate Mathematics Series)



Synopsis

Vector calculus is the fundamental language of mathematical physics. It proÂ- vides a way to describe physical quantities in three-dimensional space and the way in which these quantities vary. Many topics in the physical sciences can be analysed mathematically using the techniques of vector calculus. These topÂ- ics include fluid dynamics, solid mechanics and electromagnetism, all of which involve a description of vector and scalar quantities in three dimensions. This book assumes no previous knowledge of vectors. However, it is assumed that the reader has a knowledge of basic calculus, including differentiation, integration and partial differentiation. Some knowledge of linear algebra is also required, particularly the concepts of matrices and determinants. The book is designed to be self-contained, so that it is suitable for a proÂ- gramme of individual study. Each of the eight chapters introduces a new topic, and to facilitate understanding of the material, frequent reference is made to physical applications. The physical nature of the subject is clarified with over sixty diagrams, which provide an important aid to the comprehension of the new concepts. Following the introduction of each new topic, worked examples are provided. It is essential that these are studied carefully, so that a full unÂ- derstanding is developed before moving ahead. Like much of mathematics, each section of the book is built on the foundations laid in the earlier sections and chapters.

Book Information

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Customer Reviews

Like most other Springer books published under SUMS (Springer Undergraduate Mathematics Series) category, it shows following traits:1) it follows a down to earth approach.2) it is brief (if you cut out table of content, preface, index etc, you have 179 pages of reading material).3) there are worked out examples in pretty much all sections.4) exercises are at the end of each chapter. Worked out and fairly detailed solutions are at the end of the book.Like other reviewers have mentioned, this book does not contain much of proof. Instead, explanations are given to justify a formula or how a formula can be thought of.Another thing worth mentioning is the usage of Physics in this book. Author does make use of Physical examples sometimes, for example in section 1.2.1, Matthews uses F.d (force dot displacement) to illustrate application of dot product. These stuff are elementary Physics though. The more deeper usage of Physics is seen is at the end of the book. Last section of Chapter 7 provides two physical examples of tensor, namely Ohm’s law and inertia tensor. Finally, the last chapter is all about Application of Vector Calculus which again involves Physics.This book does NOT require you to know about vectors before hand. Infact, chapter one is all about vectors and it’s properties (addition, dot product, cross etc). Even if you already know about vectors, it won’t hurt to take a brief glimpse at this chapter.This book should NOT be used as your only source for Vector Calculus course.

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