From the Preface

Chapters 1 through 6 of this book cover the standard topics in multivariate calculus and a first course in linear algebra. The book can also be used for a course in analysis, using the proofs in the appendix.

The organization and selection of material differs from the standard approach in three ways, reflecting the following guiding principles.

First, we believe that at this level linear algebra should be more a convenient setting and language for multivariate calculus than a subject in its own right. The guiding principle of this unified approach is that, locally, a nonlinear function behaves like its derivative.

Second, we emphasize computationally effective algorithms, and we prove theorems by showing that these algorithms work.

Third, we use differential forms to generalize the fundamental theorem of calculus to higher dimensions. The great conceptual simplification gained by doing electromagnetism in the language of forms is a central motivation for using forms.

Praise for Previous Editions

"I was very impressed with the depth, clarity and ambition of this book. It respects its readers, it assumes that they are intelligent and naturally curious about beautiful mathematics. Then it provides them with all the tools necessary to learn multivariable calculus, linear algebra and basic analysis." —review of third edition, MAA Reviews

"...a real gem. It has a breadth and depth that is rarely seen in undergraduate texts, and it teaches real mathematics from a researcher's point of view instead of the standard off-the-shelf recipes that have little use outside the classroom" —review of the second edition in the MAA Monthly, October 2003

"A must-have that will become a classic." —Professor Ricardo Perez-Marco, UCLA Department of Mathematics.

"A great book. I love books that cut through the smog and show that math is not all that hard. It is a bonus when they are entertaining." —Dr. Ralph Kelsey, Ohio University

"...if these topics were taught to physicists out of your book rather than through the standard physics curriculum, much time and aggravation could be saved." —Brian Beckman, Microsoft

"The book's chief asset is its overall structure and philosophy; it does things right. It is the unique tactic of engaging rather than insulting the students' intelligence that makes the book great."
—Professor Robert Ghrist, University of Pennsylvania

"A gold mine of information not available in my other texts."
—Professor Thomas Tredon, Lord Fairfax Community College

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