# Advanced Mathematics for Applications

*By Andrea Prosperetti*



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The partial differential equations that govern scalar and vector fields are the very language used to model a variety of phenomena in solid mechanics, fluid flow, acoustics, heat transfer, electromagnetism and many others. A knowledge of the main equations and of the methods for analyzing them is therefore essential to every working physical scientist and engineer. Andrea Prosperetti draws on many years' research experience to produce a guide to a wide variety of methods, ranging from classical Fourier-type series through to the theory of distributions and basic functional analysis. Theorems are stated precisely and their meaning explained, though proofs are mostly only sketched, with comments and examples being given more prominence. The book structure does not require sequential reading: each chapter is self-contained and users can fashion their own path through the material. Topics are first introduced in the context of applications, and later complemented by a more thorough presentation.

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**Advanced Mathematics for Applications By Andrea Prosperetti Bibliography**

- Rank: #6745083 in Books
- Brand: Brand: Cambridge University Press
- Published on: 2011-02-14
- Original language: English
- Number of items: 1
- Dimensions: 9.72" h x 1.57" w x 6.85" l, 3.20 pounds
- Binding: Hardcover
- 744 pages

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Review
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"This is a really wonderful book. It offers an amazing variety of information, well condensed but nevertheless very clear and easily understandable. It can be used just for learning mathematics, its notions and insights, yet the advanced reader discovers new, unexpected material over and over again, becoming up to date in a broader field, learning special methods, or using the book as an excellent manual when solving problems and exercises. The author has succeeded in creating a new, highly innovative kind of textbook. This most valuable modern book hardly needs recommendation, since it captures the reader as soon as she or he starts reading. We shall soon find it in reference lists. The author deserves the highest praise for this wonderful intellectual gift to the community. It certainly involved a huge amount of work combined with an expert's broad knowledge."
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Laura K. Gross, Bridgewater State University for SIAM Review

About the Author
Andrea Prosperetti is the Charles A. Miller, Jr Professor in the Department of Mechanical Engineering at The Johns Hopkins University. He also holds the Berkhoff Chair in the Department of Applied Sciences at the University of Twente, Enschede, Netherlands.

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