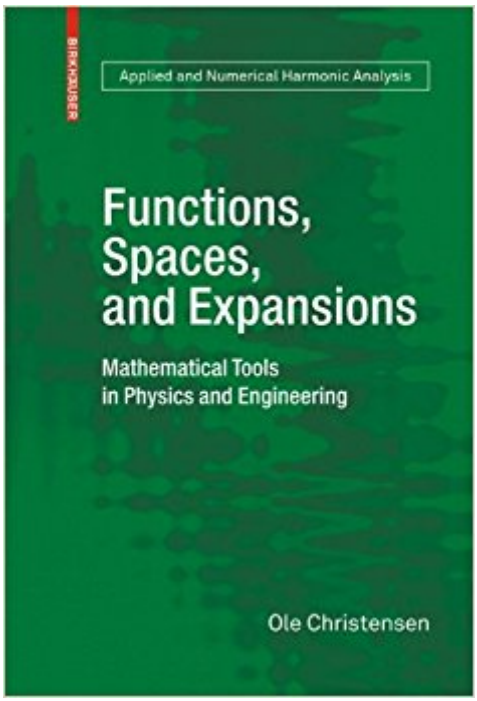
Functions, Spaces, And Expansions: Mathematical Tools In Physics And Engineering (Applied And Numerical Harmonic Analysis)



Synopsis

This graduate-level textbook is a detailed exposition of key mathematical tools in analysis aimed at students, researchers, and practitioners across science and engineering. Every topic covered has been specifically chosen because it plays a key role outside the field of pure mathematics. Although the treatment of each topic is mathematical in nature, and concrete applications are not delineated, the principles and tools presented are fundamental to exploring the computational aspects of physics and engineering. Readers are expected to have a solid understanding of linear algebra, in Rn and in general vector spaces. Familiarity with the basic concepts of calculus and real analysis, including Riemann integrals and infinite series of real or complex numbers, is also required.

Book Information

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Customer Reviews

From the reviews:Ã¢â ¬Å“This textbook presents basic mathematical tools of computational harmonic analysis for students of applied mathematics, physics and engineering and presupposes only mild knowledge from linear algebra, calculus and real analysis. Ã¢â ¬Â¦ This book is carefully written and surely provides a rewarding read for the intended audience. It also contains a number of well selected exercises at the end of each chapter.Ã¢â ¬Â• (R. Steinbauer, Monatshefte fÃƒÂ r Mathematik, Vol. 169 (1), January, 2013)Ã¢â ¬Å“This textbook aims at representing the mathematical tools of computational harmonic and Fourier analysis in a form that is suitable for students in applied mathematics, physics and engineering. Ã¢â ¬Â¦ The book is beautifully written.

It contains also a lot of suitable exercises at the end of each section.Ã¢â ¬Â• (Gerlind Plonka-Hoch, Zentralblatt MATH, Vol. 1231, 2012)Ã¢â ¬Å“This book is Ã¢â ¬Â¦ aimed at students of applied mathematics and engineering. Ã¢â ¬Â¦ it is clearly written and it does provide a useful summary of the basic properties of the tools it covers. It does a good job of explaining the difference in the various function spaces. It has detailed coverage of wavelets and the related subjects of B-splines and multiresolution analysis, although still without applications.Ã¢â ¬Â• (Allen Stenger, The Mathematical Association of America, December, 2010)

This graduate-level textbook is a detailed exposition of key mathematical tools in analysis aimed at students, researchers, and practitioners across science and engineering. Every topic covered has been specifically chosen because it plays a key role outside the field of pure mathematics. Although the treatment of each topic is mathematical in nature, and concrete applications are not delineated, the principles and tools presented are fundamental to exploring the computational aspects of physics and engineering. A central theme of the book is the structure of various vector spacesÃ¢â ¬â ¢most importantly, Hilbert spacesÃ¢â ¬â ¢and expansions of elements in these spaces in terms of bases.Key topics and features include:* More than 150 exercises* Abstract and normed vector spaces* Approximation in normed vector spaces* Hilbert and Banach spaces* General bases and orthonormal bases* Linear operators on various normed spaces* The Fourier transform, including the discrete Fourier transform* Wavelets and multiresolution analysis* B-splines* SturmÃ¢â ¬â œLiouville problemsAs a textbook that provides a deep understanding of central issues in mathematical analysis, Functions, Spaces, and Expansions is intended for graduate students, researchers, and practitioners in applied mathematics, physics, and engineering. Readers are expected to have a solid understanding of linear algebra, in Rn and in general vector spaces. Familiarity with the basic concepts of calculus and real analysis, including Riemann integrals and infinite series of real or complex numbers, is also required.Functions, Spaces, and Expansions is the main textbook for the e-course Mathematics 4: Real Analysis currently being taught at the Technical University of Denmark. Please click the "Course Materials" link on the right to access videos of the lectures, problem sheets, and solutions to selected exercises.

Great book. Fast delivery.

I didn’t study the material yet, but briefly scanned through the book.The organization is very good.It covers metric space, Banach and Hilbert Space, Fourier Transform, and Wavelet analysis.Note that

it have two entire chapters on L^p and L^2 spaces to show engineering applications.The two chapters are very useful for engineers.However, the book is not self-contained.Around 1/3 of the proofs are left to reader as "exercise".This is the main reason that I rate this book 3 stars.It has potential to become a standard textbook.However, many proofs are incomplete.It is a good book, but NOT for self-study.

I came upon this book through a Google search related to linear operators on normed vector spaces while working through Rudin’s Real and Complex Analysis for a university course. For the same reason that the previous reviewer gave the book only three stars I am giving 5. It is an excellent reference for getting a solid "high level" view of introductory Banach and Hilbert spaces and Fourier series.Working from both Real and Complex Analysis and Principles of Mathematical Analysis it is very easy to fall into a "forest for the trees" type of situation and get easily lost in Rudin’s very terse yet very dense proofs. Although as a student of mathematics it is absolutely necessary to tackle analysis at the depth and rigor required of Rudin it is also very, very helpful to gain an broader yet more explicit understanding of the subject (along with its underlying motivation) which this books does excellently!Along with Linear Algebra Done Right and Apostol’s Mathematical Analysis, this book has become a go-to reference for me! Can’t recommend it enough!

in Pure & Applied Mathematics) Asymptotic Expansions (Dover Books on Mathematics) Mathematical Analysis: An Introduction to Functions of Several Variables Numerical Simulation and Optimal Control in Plasma Physics: With Applications to Tokamaks (Modern Applied Mathematics Series) Applied Numerical Methods with MATLAB for Engineers and Scientists (Civil Engineering) Numerical Analysis: Mathematics of Scientific Computing (The Sally Series; Pure and Applied Undergraduate Texts, Vol. 2) Leadership Roles and Management Functions in Nursing: Theory and Application (Marquis, Leadership Roles and Management Functions in Nursing) Basic Immunology Updated Edition: Functions and Disorders of the Immune System With STUDENT CONSULT Online Access, 3e (Basic Immunology: Functions and Disorders of the Immune System) Mathematical Problems from Combustion Theory (Applied Mathematical Sciences) (v. 83)