

Recent Applications of Harmonic Analysis to Function Spaces, Differential Equations, and Data Science

Novel Methods in Harmonic Analysis, Volume 2

The second of a two volume set on novel methods in harmonic analysis, this book draws on a number of original research and survey papers from well-known specialists detailing the latest innovations and recently discovered links between various fields. Along with many deep theoretical results, these volumes contain numerous applications to problems in signal processing, medical imaging, geodesy, statistics, and data science. The chapters within cover an impressive range of ideas from both traditional and modern harmonic analysis, such as: the Fourier transform, Shannon sampling, frames, wavelets, functions on Euclidean spaces, analysis on function spaces of Riemannian and sub-Riemannian manifolds, Fourier analysis on manifolds and Lie groups, analysis on combinatorial graphs, sheaves, co-sheaves, and persistent homologies on topological spaces.

Volume II is organized around the theme of recent applications of harmonic analysis to function spaces, differential equations, and data science, covering topics such as:

- The classical Fourier transform, the non-linear Fourier transform (FBI transform), cardinal sampling series and translation invariant linear systems.
- Recent results concerning harmonic analysis on non-Euclidean spaces such as graphs and partially ordered sets.
- Applications of harmonic analysis to data science and statistics
- Boundary-value problems for PDE's including the Runge-Walsh theorem for the oblique derivative problem of physical geodesy.

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128,39 €

119,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783319555553

Medium: Buch

ISBN: 978-3-319-55555-3

Verlag: Springer

Erscheinungstermin: 29.08.2017

Sprache(n): Englisch

Auflage: 1. Auflage 2017

Serie: Applied and Numerical Harmonic Analysis

Produktform: Gebunden

Gewicht: 9044 g

Seiten: 510

Format (B x H): 160 x 241 mm

