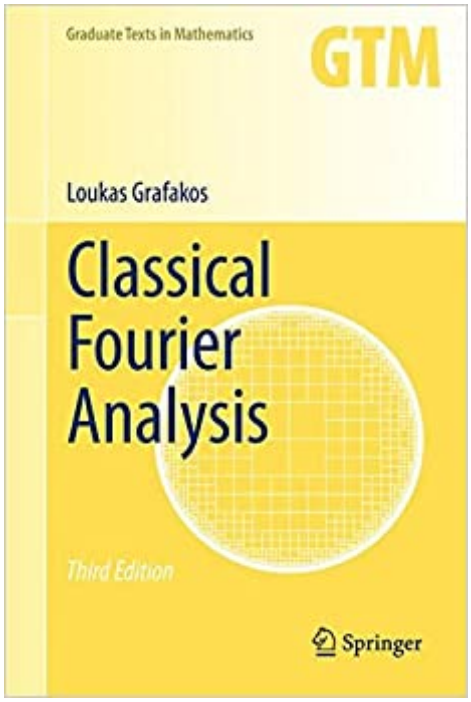
Classical Fourier Analysis (Graduate Texts In Mathematics)



Synopsis

The main goal of this text is to present the theoretical foundation of the field of Fourier analysis on Euclidean spaces. It covers classical topics such as interpolation, Fourier series, the Fourier transform, maximal functions, singular integrals, and Littlewoodâ “Paley theory. The primary readership is intended to be graduate students in mathematics with the prerequisite including satisfactory completion of courses in real and complex variables. The coverage of topics and exposition style are designed to leave no gaps in understanding and stimulate further study.This third edition includes new Sections 3.5, 4.4, 4.5 as well as a new chapter on â œWeighted Inequalities,â • which has been moved from GTM 250, 2nd Edition. Appendices I and B.9 are also new to this edition. Countless corrections and improvements have been made to the material from the second edition. Additions and improvements include: more examples and applications, new and more relevant hints for the existing exercises, new exercises, and improved references.

Book Information

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Customer Reviews

â œThe most up-to-date account of the most important developments in the area. â | It has to be pointed out that the hard ones usually come with a good hint, which makes the book suitable for self-study, especially for more motivated students. That being said, the book provides a good reference point for seasoned researchers as wellâ • (Atanas G. Stefanov, Mathematical Reviews, August, 2015)

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This book works out many calculations that are seldom given and usually brushed off as routine calculations: things like spherical surface measure in n-dimensions, integrals involving Bessel functions, formulas for derivatives and Fourier transforms of tempered distributions, or properties of the Riesz transform. These are routine once you are familiar with them, but even then they take time and careful attention when doing changes of variables, and it is nice to have this calculations worked out. Usually when I do any calculation involving spherical surface measure I will check Grafakos.Aside from the fundamental material on the Fourier transform of Schwartz functions and of tempered distributions, the Riesz-Thorin interpolation theorem, and Fourier analysis on the n-dimensional torus, there is a good chapter on singular integral operators. There are in fact few books that present singular integral operators, and as an introduction to this topic Grafakos is better than Stein’s "Singular Integrals and Differentiability Properties of Functions" and Muscalu and Schlag’s "Classical and Multilinear Harmonic Analysis". There is a chapter on Littlewood-Paley theory. Sobolev spaces do not appear in this volume, but do appear in the next volume, "Modern Fourier Analysis", which also covers Besov spaces, which is a rare treat.Grafakos doesn’t cover

harmonic analysis on spheres, where words like the spherical Laplacian and solid spherical harmonics appear. Probably this is best fitted into the theory of Lie groups and homogeneous spaces, because the sphere in R^n is a homogeneous space and is not a locally compact abelian group.