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#### 内容概要

本书内容简介: This book is an outgrowth of a course which I gave at Orsay duringthe academic year 1 966.67 MY purpose in those lectures was to pre-sent some of the required background and at the same time clarify theessential unity that exists between several related areas of analysis.These areas are : the existence and boundedness of singular integral op-erators ; the boundary behavior of harmonic functions ; and differentia-bility properties of functions of several variables.AS such the commoncore of these topics may be said to represent one of the central develop-ments in n.dimensional Fourier analysis during the last twenty years , and it can be expected to have equal influence in the future.These pos.

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#### 书籍目录

PREFACE NOTATION . SOME FUNDAMENTAL NOTIONS OF REAL . VARIABLE THEORY The maximal function Behavior near general points of measurable sets Decomposition in cubes of open sets in R " An interpolation theorem for L Further results . SINGULAR INTEGRALS Review of certain aspects of harmonic analysis in R " Singular integrals : the heart of the matter Singular integrals : some extensions and variants of the preceding Singular integral operaters which commute with dilations Vector . valued analogues Further results . RIESZ TRANSFORMS, POLSSON INTEGRALS, AND SPHERICAI HARMONICS The Riesz transforms Poisson integrals and approximations to the identity Higher Riesz transforms and spherical harmonics Further results . THE LITTLEWOOD . PALEY THEORY AND MULTIPLIERS The Littlewood-Paley g-function The functiong Multipliers(first version) Application of the partial sums operators The dyadic decomposition The Marcinkiewicz multiplier theorem Further results . DIFFERENTIABILITY PROPERTIES IN TERMS OF FUNCTION SPACES **Riesz potentials** The Sobolev spaces **Bessel** potentials The spaces of Lipschitz continuous functions The spaces Further results . EXTENSIONS AND RESTRICTIONS Decomposition of open sets into cubes Extension theorems of Whitney type Extension theorem for a domain with minimally smooth boundarv Further results . RETURN TO THE THEORY OF HARMONIC FUNCTIONS Non-tangential convergence and Fatou'S theorem The area integral

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Application of the theory of H " spaces Further results . DIFFERENTIATION OF FUNCTIONS Several qotions of pointwise difierentiability The splitting of functions A characterization 0f difrerentiability Desymmetrization principle Another characterization of difirerentiabiliW Further results **APPENDICES** Some Inequalities The Marcinkiewicz Interpolation Theorem Some Elementary Properties of Harmonic Functions Inequalities for Rademacher Functions **BIBLI0GRAPHY** INDEX

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#### 章节摘录

The basic ideas of the theory of real variables are connected with the concepts of sets and ftmctions, together with the processes of integration and differentiation applied to them. While the essential aspects of these ideas were brought to light in the early part of our century, some of their further applications were developed only more recently. It is from this latter perspective that we shall approach that part of the theory that interests US. In doing SO

, we distinguish several main features : The theorem of Lebesgue about the differentiation of the integral. The study of properties related to this process iS best done in terms of a "maximal function" to which it gives rise : the basic features of the latterare expressed in terms of a "weak-type" inequality which iS characteristicof this situation. Certain covering lemmas. In general the idea iS to cover an arbitraryopen set in terms of a disioint union ofcubes or balls , chosen in a mannerdepending on the problem at hand. ORe such example iS a lemma of Whitney , fTheorem 3 ). Sometimes , however , it SHffices to cover only aportion of the set.

as in the simple covering lemma , which iS used to prove the weak-type inequality mentioned above. f31 Behavior near a ' 'general " point of an arbitrary set. The simplest notion here iS that of point of density. More refined properties are bestexpressed in terms of certain integrals first studied systematically by Marcinkiewicz. ( 4 ) The splitting of functions into their large and small parts. Thisfeature which iS more of a technique than an end in itself , recurs often. ItiS especially useful in proving Linequalities , as in the first theorem of this chapter. That part of the proof of the first theorem iS systematized in the Marcinkiewicz interpolation theorem discussed in § 4 of this chapter and also in Appendix B.

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