Multidimensional singular integrals and integral equations / by S. G. Mikhlin

Table of contents

Preface

- I. Introduction
- § 1. Review of Previous Work
- \S 2. Some Theorems on Linear Equations in Banach Spaces
- § 3. Stereographic Projection
- § 4. Completely Continuous Operators
- II. Simplest Properties of Multidimensional Singular Integrals
- § 5. Basic Concepts
- § 6. Lipschitz Conditions
- § 7. Order of Singular Integrals at Infinity
- § 8. Differentiation of Integrals with a Weak Singularity
- III. Compounding of Singular Integrals
- § 9. Compounding of Singular and Ordinary Integrals
- § 10. Compounding of Double Singular Integrals
- § 11. The Concept of a Singular Operator
- § 12. Compounding of Double Singular Integrals. The Symbol
- § 13. Compounding of Multidimensional Singular Integrals
- § 14. Formulae for Reference
- § 15. Product of the Operators A1 and An
- § 16. Product of the Operators A2 and An
- § 17. Calculation of x1,m
- § 18. Symbol of a Multidimensional Singular Integral
- IV. Properties of the Symbol
- § 19. Fourier Transform of a Singular Kernel
- § 20. Fourier Transform of a Kernel and the Symbol of a Singular Operator
- § 21. Transformation of the Symbol Under Change of Variables
- § 22. Differentiability of the Symbol
- § 23. The Conditions for the Continuity of the Symbol

V. Singular Integrals in Lp Spaces

§ 24. The Simplest Corollaries from the Fourier Transform. First Theorem on Boundedness in L2 Space

- § 25. Symbol Dependent on the Pole. Second Theorem on Boundedness in L2 Space
- § 26. On the Boundedness of a Singular Integral Operator in Lp Space
- § 27. Integrals Taken Over any Manifold
- § 28. Differential Properties of Singular Integrals
- VI. Further Investigation of the Symbol
- § 29. More About the Differentiation of Integrals with a Weak Singularity
- § 30. Polyharmonic Potentials
- § 31. Series of Spherical Functions
- § 32. Differential Properties of the Symbol and the Characteristic

- § 33. Rule for the Multiplication of the Symbols in the General Case
- § 34. Conjugate Singular Operator
- VII. Singular Integral Equations
- § 35. The Case Where the Symbol is Independent of the Pole

§ 36. The Case Where the Symbol is Dependent on pole. Regularization and Domains of Constancy of the Index

- § 37. Equivalent Regularization. Index Theorem
- § 38. Equations with an Integral Taken Over a Closed Manifold
- § 39. Extension by Means of the Parameter
- § 40. Systems of Singular Integral Equations
- § 41. Singular Integral Equations in Classes of Lipschitz Functions
- VIII. Miscellaneous Applications
- § 42. Leading Derivatives of Volume Potential
- § 43. Problem of the Oblique Derivative
- § 44. Inequality Involving the Tangential and Normal Components of the Gradient of a Harmonic Function
- § 45. Equilibrium of an Isotropic Elastic Body
- § 46. Diffraction of Stationary Elastic Waves

Appendix. Multipliers of Fourier Integrals

Bibliography

Index