Elliptic Boundary Value Problems in Domains with Point Singularities

- M.S. Agranovich 2014-03-12 This EMS volume gives an overview of the modern theory of elliptic boundary value problems, with contributions focusing on differential elliptic boundary problems and their

- Vitaly Volpert 2011-03-03 The theory of elliptic partial differential equations has undergone an important development over the last two centuries. Together with electrostatics, heat and mass

- V. G. Maz'ya 2010-04-22 This is the first monograph which systematically treats elliptic boundary value problems in domains of polyhedral type. The authors mainly describe their own recent

- Shmuel Agmon 2010-02-03 This book, which is a new edition of a book originally published in 1965, presents an introduction to the theory of higher-order elliptic boundary value problems. The

- Monique Dauge 2006-11-14 This research monograph focusses on a large class of variational elliptic problems with mixed boundary conditions on domains with various corner

- Michail Borsuk 2006-01-12 The book contains a systematic treatment of the qualitative theory of elliptic boundary value problems for linear and

- Carlos E. Kenig 1994 In recent years, there has been a great deal of activity in the study of boundary value problems with minimal smoothness assumptions on the coefficients or on the boundary of the domain in question. These problems are of interest both because of their theoretical importance and the implications for applications, and they have turned out to have profound and fascinating connections with many areas of analysis. Techniques from harmonic analysis have proved to be extremely useful in these studies, both as concrete tools in establishing theorems and as models which suggest what kind of result might be expected in the general case. The book is intended for graduate students and researchers working on the study of classical boundary value problems for linear partial differential equations. It also contains a study of spectral properties of operators associated with elliptic boundary value problems. Weyl's law on the asymptotic distribution of eigenvalues is studied in great generality.

Elliptic Equations in Polyhedral Domains

- G. Y. Maz'ya 2010-04-22 This is the first monograph which systematically treats elliptic boundary value problems in domains of polyhedral type. The authors mainly describe their own recent

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Elliptic Partial Differential Equations-Vitaly Volpert 2011-03-03 The theory of elliptic partial differential equations has undergone an important development over the last two centuries. Together with electrostatics, heat and mass

- Zohar Yosibash 2011-12-02 This introductory and self-contained book gathers as much explicit mathematical results on the smoothness and asymptotics of solutions in unbounded domains as possible, and also a means to obtain further one in many explicit situations.

Elliptic Boundary Value Problems In Domains With Point Singularities

Elliptic Boundary Value Problems in Domains with Point Singularities-A. V. Kozlov 1997 This monograph systematically treats a theory of elliptic boundary value problems in domains without singularities and in domains with conical or planar points. This exposition is self-contained and a priori requires only basic knowledge of functional analysis. Restricting to boundary value problems formed by differential operators and avoiding the use of pseudo-differential operators and their symbolic calculus, the author presents a general approach to the theory of elliptic boundary value problems, regularity assertions and asymptotic formulas for the solutions near singular points. A special feature of the book is that the solutions of the boundary value problems are considered in Sobolev spaces of both positive and negative orders. Results of the general theory are illustrated by concrete examples. The book may be used for courses in partial differential equations.

Elliptic Boundary Value Problems on Corner Domains-Monique Dauge 2006-11-14 This research monograph focusses on a large class of variational elliptic problems with mixed boundary conditions on domains with various corner singularities, edges, polyhedral vertices, cracks, slits. In a natural functional framework (for Sobolev-Hilbert spaces) Friedel's and semi-Friedel's properties of induced operators are completely characterized. By specializing the general abstract setting to the specific case of the Dirichlet problem, precise regularity results may be obtained. In particular, results on the regularity of solutions of a new type of characteristic condition are introduced which involves the spectrum of associated operator pencils and some ideals of polynomials satisfying some boundary conditions on cones. The methods involve many perturbation arguments and a new use of Molin transform. Basic knowledge about BV on smooth domains in Sobolev is the main prerequisite to the understanding of this book. Readers interested in the general theory of corner domains will find here a new basic theory (new approach and results) as well as a synthesis of many already known results; those who need regularity conditions and descriptions of singularities for numerical analysis will find precise statements and also a means to obtain further one in many explicit situations.


Singularities in Elliptic Boundary Value Problems and Elasticity and Their Connection with Failure Initiation-Zhao Yoshikah 2011-12-02 This introductory and self-contained book gathers as much explicit mathematical results on the linear-elastic and heat-conduction solutions in the neighborhood of singular points in two-dimensional domains, and singular edges and vertices in three-dimensional domains. There are presented in an engineering terminology for practical usage. The author treats mathematical formalisms from an engineering viewpoint and presents high-order finite-element methods for the computation of singular solutions in isotropic and anisotropic materials, and multi-material interfaces. The proper interpretation of these results in engineering practice is advocated, so that the computed data can be correlated to experimental observations. The book is divided into fourteen chapters, each containing several sections. Most of it (the first nine Chapters) addresses two-dimensional domains, where only singular points exist. The solution in a vicinity of these points admits an asymptotic expansion composed of eigenpairs and associated generalized fluxes of intensity factors (CSI/CSI), which are being computed analytically when possible or by finite element methods otherwise. Singular points associated with weakly coupled thermoelasticity in the vicinity of singularities are also addressed and thermal GSIs are computed. It is important in computing practice for predicting failure initiation in brittle material on a daily basis. Several failure laws for two-dimensional domains with V-notches are presented. The book deals with failure initiation for predicting failure initiation in brittle material, characterization of fracture surfaces, evaluation of the fracture parameters, and estimation of the fracture toughness and the failure initiation threshold. A treatment of a topic of active research and interest, and is addressed herein. Explicit singular solutions in the vicinity of vertices and edges in three-dimensional domains are provided in the remaining five chapters. New methods for the computation of generalized edge fluxes/flux intensity factors along singular edges are presented and demonstrated by several example problems from the field of fracture mechanics; including anisotropic domains and bifurcational interfaces. Circular edges are also presented and the author concludes with some remarks on open questions. This well illustrated book will appeal to both applied mathematicians and engineers working in the field of fracture mechanics and singularities.

Beijing Lectures in Harmonic Analysis-Summer Symposium of Analysis in China (1984 Beijing Da Xue) 1986-11-21 Based on seven lecture series given by leading experts at a summer school at Peking University, in Beijing, in 1984. This book presents recent developments in the areas of harmonic analysis most closely related to the theory of linear partial differential equations, real-variable methods, and applications to several complex variables and partial differential equations. The different lecture series are closely interrelated; each contains a substantial amount of background material, as well as new results not previously published. The contributors to the volume are R. B. Cutler and Vee Meyer, Robert Fefferman, Carlos K. Kenig, Steven G. Krantz, Alexander Nagel, E. M. Stein, and Stephen Wainger.


Partial Differential Equations IX

- V. Mazya 2000-05-01 For the first time in the mathematical literature this two-volume work introduces a unified and general approach to the subject. To a large extent, the book is based on the authors' work, and has no significant overlap with earlier books on the theory of elliptic boundary value problems.

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Lectures on Elliptic Boundary Value Problems-Shmuel Agmon 2010-02-03 This book, which is a new edition of a book originally published in 1965, presents an introduction to the theory of higher-order elliptic boundary value problems. The book contains a study of basic facts of the theory of elliptic boundary value problems, such as the problem of existence and regularity of solutions of higher-order elliptic boundary value problems. It also contains a study of spectral properties of operators associated with elliptic boundary value problems. Weyl's law on the asymptotic distribution of eigenvalues is studied in great generality.

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differential operator. The methods presented herein capitalize on the theory of elliptic boundary value problems with nonsmooth boundary that has been developed in the past thirty years. Moreover, a study on the homogenization of difference equations on periodic grids and lattices is given. Much attention is paid to concrete problems in mathematical physics, particularly elasticity theory and electrodynamics. To a large extent the work is based on the authors' work and has no significant overlap with other books on the theory of elliptic boundary value problems.

Elliptic Boundary Value Problems in Non-smooth Domains

Josip Globevnik

Spectral Problems Associated with Corner Singularities of Solutions to Elliptic Equations
Vladimir Kozlov

The Hodge-Laplacian
Dominic Mitrea

Elliptic Boundary Value Problems in Domains With Point Singularities
Vladimir Kozlov

The Hodge-Laplacian

Asymptotic Theory of Elliptic Boundary Value Problems in Singularly Perturbed Domains
Vladimir Maz'ya

The Hodge-Laplacian

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Asymptotic Theory of Elliptic Boundary Value Problems in Singularly Perturbed Domains - Vladimir Maz'ya

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