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PATEL LAYLA

Problem Posing and Problem Solving in Mathematics Education American Mathematical Soc.
This book focuses on solutions of second order, linear, parabolic, partial differentialequations on an infinite strip-emphasizing their integral representation, their initialvalues in several senses, and the relations between these.Parabolic Equations on an Infinite Strip provides valuable information-previously unavailable in a single volume-on such topics as semigroup property.. . the Cauchy problem ... Gauss-Weierstrass representation . .. initial limits .. .normal limits and related representation theorems ... hyperplane conditions .. .determination of the initial measure .. . and the maximum principle. It also exploresnew, unpublished results on parabolic limits . . . more general limits ... and solutionssatisfying LP conditions.Requiring only a fundamental knowledge of general analysis and measure theory, thisbook serves as an excellent text for graduate students studying partial differentialequations and harmonic analysis, as well as a useful reference for analysts interested inapplied measure theory, and specialists in partial differential equations.
Obstacle Problems in Mathematical Physics CUP Archive
This paper studies two types of integral transformation associated with fractional Brownian motion. They are applied to construct approximation schemes for fractional Brownian motion by polygonal approximation of standard Brownian motion. This approximation is the best in the sense that it minimizes the mean square error. The rate of convergence for this approximation is obtained. The integral transformations are combined with the idea of probability structure preserving mapping introduced in [48] and are applied to develop a stochastic calculus for fractional Brownian motions of all Hurst parameter $H\in (0, 1)$. In particular we obtain Radon-Nikodym derivative of nonlinear (random) translation of fractional Brownian motion over finite interval, extending the results of [48] to general case. We obtain an integration by parts formula for general stochastic integral and an Ito type formula for some stochastic integral.The conditioning, Clark derivative, continuity of stochastic integral are also studied. As an application we study a linear quadratic control problem, where the system is driven by fractional Brownian motion.
Differential and integral inequalities; theory and applications PART B: Functional, partial, abstract, and complex differential equations Springer
This is the only book available that fully analyzes the mathematical foundations of the finite element method. Not only is it valuable reference and introduction to current research, it is also a working textbook for graduate courses in numerical analysis, including useful figures and exercises of varying difficulty.
Open Problems in Mathematics Cambridge University Press
This book focuses on the analysis of eigenvalues and eigenfunctions that describe singularities of solutions to elliptic boundary value problems in domains with corners and edges. The authors treat both classical problems of mathematical physics and general elliptic boundary value problems.

The volume is divided into two parts: The first is devoted to the power-logarithmic singularities of solutions to classical boundary value problems of mathematical physics. The second deals with similar singularities for higher order elliptic equations and systems. Chapter 1 collects basic facts concerning operator pencils acting in a pair of Hilbert spaces. Related properties of ordinary differential equations with constant operator coefficients are discussed and connections with the theory of general elliptic boundary value problems in domains with conic vertices are outlined. New results are presented. Chapter 2 treats the Laplace operator as a starting point and a model for the subsequent study of angular and conic singularities of solutions. Chapter 3 considers the Dirichlet boundary condition beginning with the plane case and turning to the space problems. Chapter 4 investigates some mixed boundary conditions. The Stokes system is discussed in Chapters 5 and 6, and Chapter 7 concludes with the Dirichlet problem for the polyharmonic operator. Chapter 8 studies the Dirichlet problem for general elliptic differential equations of order 2m in an angle. In Chapter 9, an asymptotic formula for the distribution of eigenvalues of operator pencils corresponding to general elliptic boundary value problems in an angle is obtained. Chapters 10 and 11 discuss the Dirichlet problem for elliptic systems of differential equations of order 2 in an n-dimensional cone. Chapter 12 studies the Neumann problem for general elliptic systems, in particular with eigenvalues of the corresponding operator pencil in the strip $\mid {\Re} \lambda - m + /2n \mid \leq 1/2$. It is shown that only integer numbers contained in this strip are eigenvalues. Applications are placed within chapter introductions and as special sections at the end of chapters. Prerequisites include standard PDE and functional analysis courses.

Nonlinear Analysis on Manifolds. Monge-Ampère Equations Springer Science & Business Media

This volume contains a multiplicity of approaches brought to bear on problems varying from the formation of caustics and the propagation of waves at a boundary, to the examination of viscous boundary layers. It examines the foundations of the theory of high- frequency electromagnetic waves in a dielectric or semiconducting medium. Nor are unifying themes entirely absent from nonlinear analysis: one chapter considers microlocal analysis, including paradifferential operator calculus, on Morrey spaces, and connections with various classes of partial differential equations.

Nonlinear Hyperbolic Problems CUP Archive

I. In this second volume, we continue at first the study of non homogeneous boundary value problems for particular classes of evolu tion equations. 1 In Chapter 4 , we study parabolic operators by the method of Agranovitch-Vishik [lJ; this is step (i) (Introduction to Volume I, Section 4), i.e. the study of regularity. The next steps: (ii) transposition, (iii) interpolation, are similar in principle to those of Chapter 2, but involve rather considerable additional technical difficulties. In Chapter 5, we study hyperbolic operators or operators well defined in thesense of Petrowski or Schroedinger. Our regularity results (step (i)) seem to be new. Steps (ii) and (iii) are all3.logous to those of the parabolic case, except for certain technical differences. In Chapter 6, the results of Chapter'> 4 and 5 are applied to the study of optimal control problems for systems governed by evolution equations, when the control appears in the boundary conditions (so that non-homogeneous boundary value problems are the basic tool of this theory). Another type of application, to the characterization of "all" well-posed problems for the operators in question, is given in the Ap pendix. Still other applications, for example to numerical analysis, will be given in Volume 3.

Boundary Element Analysis Springer

The general aim of the present monograph is to study boundary-value problems for second-order elliptic operators in Lipschitz sub domains of Riemannian manifolds. In the first part (ss1-4), we develop a theory for Cauchy type operators on Lipschitz submanifolds of co dimension one (focused on boundedness properties and jump relations) and solve the Lp-Dirichlet problem, with p close to 2, for general second-order strongly elliptic systems. The solution is represented in the form of layer potentials and optimal non tangential maximal function estimates are established.This analysis is carried out under smoothness assumptions (for the coefficients of the operator, metric tensor and the underlying domain) which are in the nature of best possible. In the second part of the monograph, ss5-13, we further specialize this discussion to the case of Hodge Laplacian $\Delta: =-d\delta-\delta d$. This time, the goal is to identify all (pairs of) natural boundary conditions of Neumann type. Owing to the structural richness of the higher degree case we are considering, the theory developed here encompasses in a unitary fashion many basic PDE's of mathematical physics. Its scope extends to also cover Maxwell's equations, dealt with separately in s14. The main tools are those of PDE's and harmonic analysis, occasionally supplemented with some basic facts from algebraic topology and differential geometry.

Non-Homogeneous Boundary Value Problems and Applications Academic Press

The objective of this book is to analyze within reasonable limits (it is not a treatise) the basic mathematical aspects of the finite element method. The book should also serve as an introduction to current research on this subject. On the one hand, it is also intended to be a working textbook for advanced courses in Numerical Analysis, as typically taught in graduate courses in American and French universities. For example, it is the author’s experience that a one-semester course (on a three-hour per week basis) can be taught from Chapters 1, 2 and 3 (with the exception of Section 3.3), while another one-semester course can be taught from Chapters 4 and 6. On the other hand, it is hoped that this book will prove to be useful for researchers interested in advanced aspects of the numerical analysis of the finite element method. In this respect, Section 3.3, Chapters 5, 7 and 8, and the sections on “Additional Bibliography and Comments should provide many suggestions for conducting seminars.

The Finite Element Method for Elliptic Problems Elsevier

From the reviews: "This is a book of interest to any having to work with differential equations, either as a reference or as a book to learn from. The authors have taken trouble to make the treatment self-contained. It (is) suitable required reading for a PhD student." --New Zealand Mathematical Society, 1985

Proceedings of the International Congress of Matematics 14-21 August 1958 Springer Science & Business Media

This book presents both theoretical and empirical contributions from a global perspective on problem solving and posing (PS/PP) and their application, in relation to the teaching and learning of mathematics in schools. The chapters are derived from selected presentations in the PS/PP Topical Study Group in ICME14. Although mathematical problem posing is a much younger field of inquiry in mathematics education, this topic has grown rapidly. The mathematics curriculum frameworks in many parts of the world have incorporated problem posing as an instructional focus, building on problem solving as its foundation. The juxtaposition of problem solving and problem posing in mathematics presented in this book addresses the needs of the mathematics education research and practice communities at the present day. In particular, this book aims to address the three key points: to present an overview of research and development regarding students’ mathematical problem solving and posing; to discuss new trends and developments in research and practice on these topics; and to provide insight into the future trends of mathematical problem solving and posing.

Singularities and Oscillations Routledge

Un cahier recommandé par les enseignants et conforme au programme pour s'entrainer en maths CP. Avec des leçons visuelles, 250 exercices progressifs, des conseils pour les enfants. Des mémos pour apprendre autrement et facilement. Les corrigés dans un livret détachable. Exercices interactifs sur www.hatier-entrainement.com.

Some Nonlinear Problems in Riemannian Geometry SIAM

This volume is intended to allow mathematicians and physicists, especially analysts, to learn about nonlinear problems which arise in Riemannian Geometry. Analysis on Riemannian manifolds is a field currently undergoing great development. More and more, analysis proves to be a very powerful means for solving geometrical problems. Conversely, geometry may help us to solve certain problems in analysis. There are several reasons why the topic is difficult and interesting. It is very large and almost unexplored. On the other hand, geometric problems often lead to limiting cases of known problems in analysis, sometimes there is even more than one approach, and the already existing theoretical studies are inadequate to solve them. Each problem has its own particular difficulties. Nevertheless there exist some standard methods which are useful and which we must know to apply them. One should not forget that our problems are motivated by geometry, and that a geometrical argument may simplify the problem under investigation. Examples of this kind are still too rare. This work is neither a systematic study of a mathematical field nor the presentation of a lot of theoretical knowledge. On the contrary, I do my best to limit the text to the essential knowledge. I define as few concepts as possible and give only basic theorems which are useful for our topic. But I hope that the reader will find this sufficient to solve other geometrical problems by analysis.

Hyperbolic Boundary Value Problems American Mathematical Soc.

Boundary value problems are of central importance and interest not only to mathematicians but also to physicists and engineers who need to solve differential equations which govern the behaviour of physical systems. In this book, Professor Sakamoto introduces the general theory of the existence and uniqueness of solutions to the wave equation. The reader is assumed to have some familiarity with Lebesgue integration and complex function theory but other than that the book is essentially self-contained. It is therefore suited to senior undergraduates and graduates in mathematics and the mathematical sciences but can be read with profit by professionals in those subjects.

Elliptic Boundary Value Problems in Domains with Point Singularities World Bank Publications

Most of the problems posed by Physics to Mathematical Analysis are boundary value problems for partial differential equations and systems. Among them, the problems concerning linear evolution equations have an outstanding position in the study of the physical world, namely in fluid dynamics, elastodynamics, electromagnetism, plasma physics and so on. This Institute was devoted to these problems. It developed essentially the new methods inspired by Functional Analysis and specially by the theories of Hilbert spaces, distributions and ultradistributions. The lectures brought a detailed exposition of the novelties in this field by world known specialists. We held the Institute at the Sart Tilman Campus of the University of Liege from September 6 to 17, 1976. It was attended by 99 participants, 79 from NATO Countries [Belgium (30), Canada (2), Denmark (I), France (15), West Germany (9), Italy (5), Turkey (3), USA (14)] and 20 from non NATO Countries [Algeria (2), Australia (3), Austria (I), Finland (1), Iran (3), Ireland (I), Japan (6), Poland (1), Sweden (I), Zair (1)]. There were 5 courses of_ 6_ h. olll'. s~. 1. nL lJ. , h. t;l. l. I. rl"~, 1. n,L ,_ h. t;l. l. I. r. !'~ , ?_ n. f~ ?_ h,,

Canadian Mathematical Bulletin Springer Science & Business Media

The field of nonlinear hyperbolic problems has been expanding very fast over the past few years, and has applications - actual and potential - in aerodynamics, multifluid flows, combustion, detonics amongst other. The difficulties that arise in application are of theoretical as well as numerical nature. In fact, the papers in this volume of proceedings deal to a greater extent with theoretical problems emerging in the resolution of nonlinear hyperbolic systems than with numerical methods. The volume provides an excellent up-to-date review of the current research trends in this area.

Large Viscous Boundary Layers for Noncharacteristic Nonlinear Hyperbolic Problems Hatier

Ce cahier propose, tout au long de l'année, mais aussi pendant les vacances, un entraînement en mathématiques par des exercices et des problèmes. Comment comprendre et réussir des problèmes au CM1 ? 1 * par la préparation (pages 3 à 24) : rappel de règles et exercices d'application pour chaque notion du programme. 2 * par la méthode (pages 25 à 40) : compréhension de l'énoncé et construction du raisonnement. 3 * par l'entraînement (pages 41 à 58) résolution de séries de problèmes progressifs. En appliquant cette méthode éprouvée, l'enfant résoudra nécessairement et à son rythme toutes les difficultés qui lui sont propres. Enfin de cahier, sur des pages détachables, vous trouverez un corrigé complet des exercices et des problèmes.

Equations of Mathematical Physics Springer Science & Business Media

Differential and integral inequalities; theory and applications PART B: Functional, partial, abstract, and complex differential equations

Applied Mechanics Reviews SIAM

This concise volume presents an overview of equations of mathematical physics and generalized functions. While intended for advanced readers, the accessible introduction and text structure allows beginners to study at their own pace as the material gradually increases in difficulty. The text introduces the concept of generalized Sobolev functions and L. Schwartz distributions briefly in the opening section, gradually approaching a more in-depth study of the “generalized” differential equation (also known as integral equality). In contrast to the traditional presentation of generalized Sobolev functions and L. Schwartz distributions, this volume derives the topology from two natural requirements (which are equivalent to it). The text applies the same approach to the theory of the canonical Maslov operator. It also features illustrative drawings and helpful supplementary reading in the footnotes concerning historical and bibliographic information related to the subject of the book. Additionally, the book devotes a special chapter to the application of the theory of pseudodifferential operators and Sobolev spaces to the inverse magneto/electroencephalography problem. Explicit numerically realizable formulas related to the Cauchy problem for elliptic equations (including quasilinear ones) and also to the Poincaré--Steklov operators are presented. The book is completed by three additions, which were written by famous mathematicians Yu. V. Egorov, A. B. Antonevich, and S. N. Samborski.

Canadian Journal of Mathematics Springer Science & Business Media
Function theory and Sobolev inequalities have been the target of investigatio for decades. Sharp constants in these inequalities constitute a critical tool in geometric analysis. The AB program is concerned with sharp Sobolev inequalities on compact Riemannian manifolds. Important and significant progress has been made during recent years. We summarize the present state ad describe new results.

Canadian Journal of Mathematics Elsevier
This book deals with such important subjects as variational methods, the continuity method, parabolic equations on fiber bundles, ideas concerning points of concentration, blowing-up technique, geometric and topological methods. It explores important geometric problems that are of interest to many mathematicians and scientists but have only recently been partially solved.