Geometric Analysis Of Hyperbolic Differential Equations An Introduction London Mathematical Society Lecture Note Series

Beyond Hyperbolicity

Contains expository articles and research papers in geometric group theory focusing on generalisations of Gromov hyperbolicity.

Partial Differential Equations in Fluid Mechanics

A selection of survey articles and original research

papers in mathematical fluid mechanics, for both researchers and graduate students.

Complexity Science

This book presents introductions to the essential mathematical aspects of complexity science, suitable for advanced undergraduate/masters-level students and researchers.

Non-abelian Fundamental Groups and Iwasawa Theory

Number theory currently has at least three different perspectives on non-abelian phenomena: the Langlands programme, non-commutative Iwasawa theory and anabelian geometry. In the second half of 2009, experts from each of these three areas gathered at the Isaac Newton Institute in Cambridge to explain the latest advances in their research and to investigate possible avenues of future investigation and collaboration. For those in attendance, the overwhelming impression was that number theory is going through a tumultuous period of theory-building and experimentation analogous to the late 19th century, when many

different special reciprocity laws of abelian class field theory were formulated before knowledge of the Artin–Takagi theory. Non-abelian Fundamental Groups and Iwasawa Theory presents the state of the art in theorems, conjectures and speculations that point the way towards a new synthesis, an as-yet-undiscovered unified theory of non-abelian arithmetic geometry.

Lectures on Orthogonal Polynomials and Special Functions

Contains graduate-level introductions by international experts to five areas of research in orthogonal polynomials and special functions.

Differential Geometry in the Large

From Ricci flow to GIT, physics to curvature bounds, Sasaki geometry to almost formality. This is differential geometry at large.

The Cauchy Problem for Non-Lipschitz Semi-Linear Parabolic Partial Differential Equations

A monograph containing significant new developments in the theory of reaction-diffusion systems, particularly those arising in chemistry and life sciences.

Stacks Project Expository Collection

The Stacks Project Expository Collection (SPEC) compiles expository articles in advanced algebraic geometry, intended to bring graduate students and researchers up to speed on recent developments in the geometry of algebraic spaces and algebraic stacks. The articles in the text make explicit in modern language many results, proofs, and examples that were previously only implicit, incomplete, or expressed in classical terms in the literature. Where applicable this is done by explicitly referring to the Stacks project for preliminary results. Topics include the construction and properties of important moduli problems in algebraic geometry (such as the Deligne–Mumford compactification of the moduli of curves, the Picard functor, or moduli of semistable vector bundles and sheaves), and arithmetic questions for fields and algebraic spaces.

Recent Advances in Algebraic Geometry

A comprehensive collection of expository articles on cutting-edge topics at the forefront of research in algebraic geometry.

An Indefinite Excursion in Operator Theory

This modern introduction to operator theory on spaces with indefinite inner product discusses the geometry and the spectral theory of linear operators on these spaces, the deep interplay with complex analysis, and applications to interpolation problems. The text covers the key results from the last four decades in a readable way with full proofs provided throughout. Step by step, the reader is guided through the intricate geometry and topology of spaces with indefinite inner product, before progressing to a presentation of the geometry and spectral theory on these spaces. The author carefully highlights where difficulties arise and what tools are available to overcome them. With generous background material included in the appendices, this text is an excellent resource for researchers in operator

theory, functional analysis, and related areas as well as for graduate students.

The Maximal Subgroups of the Low-Dimensional Finite Classical Groups

Classifies the maximal subgroups of the finite groups of Lie type up to dimension 12, using theoretical and computational methods.

The Bloch-Kato Conjecture for the Riemann Zeta Function

A graduate-level account of an important recent result concerning the Riemann zeta function.

Random Walks and Heat Kernels on Graphs

Useful but hard-to-find results enrich this introduction to the analytic study of random walks on infinite graphs.

Bounded Cohomology and Simplicial Volume

Since their introduction by Gromov in the 1980s, the study of bounded cohomology and simplicial volume has developed into an active field connected to geometry and group theory. This monograph, arising from a learning seminar for young researchers working in the area, provides a collection of different perspectives on the subject, both classical and recent. The book's introduction presents the main definitions of the theories of bounded cohomology and simplicial volume, outlines their history, and explains their principal motivations and applications. Individual chapters then present different aspects of the theory, with a focus on examples. Detailed references to foundational papers and the latest research are given for readers wishing to dig deeper. The prerequisites are only basic knowledge of classical algebraic topology and of group theory, and the presentations are gentle and informal in order to be accessible to beginning graduate students wanting to enter this lively and topical field.

Facets of Algebraic Geometry: Volume 1

Written to honor the 80th birthday of William Fulton, the articles collected in this volume (the

first of a pair) present substantial contributions to algebraic geometry and related fields, with an emphasis on combinatorial algebraic geometry and intersection theory. Featured topics include commutative algebra, moduli spaces, quantum cohomology, representation theory, Schubert calculus, and toric and tropical geometry. The range of these contributions is a testament to the breadth and depth of Fulton's mathematical influence. The authors are all internationally recognized experts, and include well-established researchers as well as rising stars of a new generation of mathematicians. The text aims to stimulate progress and provide inspiration to graduate students and researchers in the field.

Moonshine - The First Quarter Century and Beyond

This volume examines the impact of the 'Monstrous Moonshine' paper on mathematics and theoretical physics.

Sheaves and Functions Modulo p

Describes how to use coherent sheaves and

cohomology to prove combinatorial and number theoretical identities over finite fields.

Evolution Equations

The proceedings of a summer school held in 2015 whose theme was long time behavior and control of evolution equations.

Asymptotic Analysis in General Relativity

Introduction to modern methods for classical and quantum fields in general relativity / Thierry Daudé, Dietrich Häfner, and Jean-Philippe Nicolas -- Geometry of black hole spacetimes / Lars Andersson, Thomas B. Ackdahl, and Pieter Blue -- An introduction to Quantum Field Theory on curved space-times / Christian Gerard -- A minicourse on microlocal analysis for wave propagation / Andras Vasy -- An introduction to conformal geometry and tractor calculus, with a view to applications in general relativity / Sean N. Curry and A. Rod Gover

Stochastic Stability of Differential Equations in Abstract Spaces

Presents a unified treatment of stochastic differential equations in abstract, mainly Hilbert, spaces.

Facets of Algebraic Geometry

Written to honor the enduring influence of William Fulton, these articles present substantial contributions to algebraic geometry.

Integrable Systems and Algebraic Geometry

A collection of articles discussing integrable systems and algebraic geometry from leading researchers in the field.

Partial Differential Equations arising from Physics and Geometry

Presents the state of the art in PDEs, including the latest research and short courses accessible to graduate students.

(Co)end Calculus

This easy-to-cite handbook gives the first systematic treatment of the (co)end calculus in category theory and its applications.

Discrete Quantum Walks on Graphs and Digraphs

Discrete quantum walks are quantum analogues of classical random walks. They are an important tool in quantum computing and a number of algorithms can be viewed as discrete quantum walks, in particular Grover's search algorithm. These walks are constructed on an underlying graph, and so there is a relation between properties of walks and properties of the graph. This book studies the mathematical problems that arise from this connection, and the different classes of walks that arise. Written at a level suitable for graduate students in mathematics, the only prerequisites are linear algebra and basic graph theory; no prior knowledge of physics is required. The text serves as an introduction to this important and rapidly developing area for mathematicians and as a detailed reference for computer scientists and physicists working on

quantum information theory.

Shimura Varieties

This volume forms the sequel to \"On the stabilization of the trace formula\

Arithmetic Differential Operators Over the P-adic Integers

This complete introduction to the study of arithmetic differential operators over the p-adic integers offers graduate students and researchers an accessible guide to this novel and promising area of mathematics. It starts with the basics and is accessible to anyone with a basic grasp of algebraic number theory.

Probability and Mathematical Genetics

Focussing on the work of Sir John Kingman, one of the world's leading researchers in probability and mathematical genetics, this book touches on the important areas of these subjects in the last 50 years. Leading authorities give a unique insight into a wide range of currently topical problems.

Papers in probability concentrate on combinatorial and structural aspects, in particular exchangeability and regeneration. The Kingman coalescent links probability with mathematical genetics and is fundamental to the study of the latter. This has implications across the whole of genomic modelling including the Human Genome Project. Other papers in mathematical population genetics range from statistical aspects including heterogeneous clustering, to the assessment of molecular variability in cancer genomes. Further papers in statistics are concerned with empirical deconvolution, perfect simulation, and wavelets. This book will be warmly received by established experts as well as their students and others interested in the content.

Permutation Groups and Cartesian Decompositions

Concise introduction to permutation groups, focusing on invariant cartesian decompositions and applications in algebra and combinatorics.

An Introduction to Galois Cohomology and its Applications

This is the first elementary introduction to Galois cohomology and its applications. The first part is self-contained and provides the basic results of the theory, including a detailed construction of the Galois cohomology functor, as well as an exposition of the general theory of Galois descent. The author illustrates the theory using the example of the descent problem of conjugacy classes of matrices. The second part of the book gives an insight into how Galois cohomology may be used to solve algebraic problems in several active research topics, such as inverse Galois theory, rationality questions or the essential dimension of algebraic groups. Assuming only a minimal background in algebra, the main purpose of this book is to prepare graduate students and researchers for more advanced study.

Groups, Graphs and Random Walks

An up-to-date, panoramic account of the theory of random walks on groups and graphs, outlining connections with various mathematical fields.

Nonlinear partial differential equations in differential geometry

This book contains lecture notes of minicourses at the Regional Geometry Institute at Park City, Utah, in July 1992. Presented here are surveys of breaking developments in a number of areas of nonlinear partial differential equations in differential geometry. The authors of the articles are not only excellent expositors, but are also leaders in this field of research. All of the articles provide in-depth treatment of the topics and require few prerequisites and less background than current research articles.

Geometric Analysis of Hyperbolic Differential Equations

A self-contained presentation of the tools of Lorentzian geometry necessary to access recent works in mathematical relativity.

Analysis and Geometry on Graphs and Manifolds

A contemporary exploration of the interplay between geometry, spectral theory and

stochastics which is explored for graphs and manifolds.

Geometric Analysis of Hyperbolic Differential Equations: An Introduction

Its self-contained presentation and 'do-it-yourself' approach make this the perfect guide for graduate students and researchers wishing to access recent literature in the field of nonlinear wave equations and general relativity. It introduces all of the key tools and concepts from Lorentzian geometry (metrics, null frames, deformation tensors, etc.) and provides complete elementary proofs. The author also discusses applications to topics in nonlinear equations, including null conditions and stability of Minkowski space. No previous knowledge of geometry or relativity is required.

Arithmetic and Geometry

The world's leading authorities describe the state of the art in Serre's conjecture and rational points on algebraic varieties.

Representation Theory and Harmonic Analysis of Wreath Products of Finite Groups

This book presents an introduction to the representation theory of wreath products of finite groups and harmonic analysis on the corresponding homogeneous spaces. The reader will find a detailed description of the theory of induced representations and Clifford theory, focusing on a general formulation of the little group method. This provides essential tools for the determination of all irreducible representations of wreath products of finite groups. The exposition also includes a detailed harmonic analysis of the finite lamplighter groups, the hyperoctahedral groups, and the wreath product of two symmetric groups. This relies on the generalised Johnson scheme, a new construction of finite Gelfand pairs. The exposition is completely self-contained and accessible to anyone with a basic knowledge of representation theory. Plenty of worked examples and several exercises are provided, making this volume an ideal textbook for graduate students. It also represents a useful reference for more experienced researchers.

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Its self-contained presentation and 'do-it-yourself' approach make this the perfect guide for graduate students and researchers wishing to access recent literature in the field of nonlinear wave equations and general relativity. It introduces all of the key tools and concepts from Lorentzian geometry (metrics, null frames, deformation tensors, etc.) and provides complete elementary proofs. The author also discusses applications to topics in nonlinear equations, including null conditions and stability of Minkowski space. No previous knowledge of geometry or relativity is required.

Topological Methods in Group Theory

Details some of the most recent developments at the interface of topology and geometric group theory. Ideal for graduate students.

Recent Progress in the Theory of the Euler and Navier-Stokes Equations

An accessible summary of a wide range of active

research topics written by leaders in their field, including exciting new results.

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