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The Physics and Mathematics of Elliott Lieb
The 90th Anniversary Volume I & II
Rupert L. Frank (Ludwig-Maximilians-Universität München, Munich Center for Quantum Science and Technology, and California Institute of Technology), Ari Laptev (Imperial College London), Mathieu Lewin (Université Paris Dauphine), and Robert Seiringer (Institute of Science and Technology Austria), eds.


These two volumes are dedicated to Elliott Lieb on the occasion of his 90th birthday. They celebrate his fundamental contributions to the fields of mathematics, physics and chemistry. Around fifty chapters give an extensive account of Lieb’s impact on a very broad range of topics and the resulting subsequent developments. Many contributions are of an expository character and are accessible to a non-expert audience of researchers in mathematics, physics and chemistry. A non-exhaustive list of topics covered includes the problem of stability of matter, quantum many-body systems, density functional theory, topics in statistical mechanics, entropy inequalities and matrix analysis, functional inequalities and sharp constants.

Regularity Theory for Elliptic PDE
Xavier Fernández-Real (École Polytechnique Fédérale de Lausanne) and Xavier Ros-Oton (ICREA, Universitat de Barcelona, and Centre de Recerca Matemàtica)

Zurich Lectures in Advanced Mathematics

This book aims to provide a self-contained introduction to the regularity theory for elliptic PDE, focusing on the main ideas rather than proving all results in their greatest generality. It can be seen as a bridge between an elementary PDE course and more advanced books. The book starts with a short review of the Laplace operator and harmonic functions. The theory of Schauder estimates is developed next, but presented with various proofs of the results. Nonlinear elliptic PDE are covered in the following, both in the variational and non-variational setting and, finally, the obstacle problem is studied in detail, establishing the regularity of solutions and free boundaries.
This book discusses certain moduli problems related to \(A_\infty\)-structures. These structures can be viewed as a way of recording extra information on cohomology algebras. They are useful in describing derived categories appearing in geometry, and as such, they play an important role in homological mirror symmetry. The author presents some general results on the classification of \(A_\infty\)-structures and also considers two concrete moduli problems. The first is related to the moduli spaces of curves, while the second is related to the classification of solutions of an associative version of the Yang–Baxter equation.

This book gives a largely self-contained exposition of the subject of regular and singular SPDEs in the particular case of the Allen–Cahn equation. Properties of the equation are discussed successively in one, two and three spatial dimensions, allowing to introduce new difficulties of the theory in an incremental way. In addition to existence and uniqueness of solutions, aspects of long-time dynamics such as invariant measures and metastability are discussed. For the three-dimensional case, the theory of regularity structures developed by Martin Hairer and co-authors is presented.

This book deals with quantum chaos, starting with a historical introduction and then focussing on the delocalisation of eigenfunctions of Schrödinger operators for chaotic Hamiltonian systems. It contains a short introduction to microlocal analysis, necessary for the Shnirelman theorem and for the author’s work on entropy of eigenfunctions on negatively curved manifolds. It covers further work by the author on quantum ergodicity of eigenfunctions on large graphs, results on eigenfunctions on the round sphere, and an exposition of the Backhausz–Szegedy result on the Gaussian distribution of eigenfunctions on random regular graphs.

This book collects several contributions and points of view on phenomena where fluid mechanics, elasticity, and their interactions are at play. It is addressed both to junior researchers entering the field as well as to experienced professionals aiming to expand their scientific knowledge to closely related disciplines. The book also aims to bring closer the mathematical and engineering communities working on fluid-structure interactions in order to create a common language and to encourage future collaborations.
This book is an introduction to graph theory, presenting most of its elementary and classical notions through an original and rigorous approach, including detailed proofs of most of the results. It covers all aspects of graph theory from an algebraic, topological and analytic point of view, while also developing the theory’s algorithmic parts. The variety of topics covered aims to lead the reader in understanding graphs in their greatest diversity in order to perceive their power as a mathematical tool.

Memoirs of the European Mathematical Society

ISSN 2747-9080 | eISSN 2747-9099 | Institutional Online €330/$345 | Institutional Print & Online €420/$440

Anton Alekseev (Université de Genève), Gerard van der Geer (Universiteit van Amsterdam), Barbara Kaltenbacher (Universität Klagenfurt), Ari Laptev (Imperial College London), Laure Saint-Raymond (Institut des Hautes Études Scientifiques), Thomas Kappeler † (Universität Zurich), eds.

Émile Borel

A Life in Mathematics and Politics Across Two Centuries

Pierre Guiraldenq (École Centrale de Lyon)
Translated and edited by Arturo Sangalli
Softcover | € 19 / $ 22

The book follows Borel, one of France’s leading scientific and political figures of the first half of the twentieth century, through the various stages and the most significant events of his life, across two centuries and two wars. Originally published in French, this new English edition of the book will appeal primarily to mathematicians and those with an interest in the history of science, but it should not disappoint anyone wishing to explore, through the life of an exceptional scientist and man, a chapter of history from the Franco-Prussian War of 1870 to the beginnings of contemporary Europe.
Forthcoming Books in 2023

Proceedings of the International Congress of Mathematicians 2022
Dmitry Belyaev (University of Oxford) and Stanislav Smirnov (Université de Genève), eds.

Proceedings of the 8th European Congress of Mathematics 2021
Klavdija Kutnar and Tomaž Pisanski (both Univerza na Primorskim), eds.

Euclidean Buildings
Geometry and Group Actions
Guy Rousseau (Université de Lorraine)
EMS Tracts in Mathematics

An Introduction to the Mathematical Fluid Dynamics of Oceanic and Atmospheric Flows
Robin S. Johnson (Newcastle University)
ESI Lectures in Mathematics and Physics

Essays in Geometry – Dedicated to Norbert A’Campo
Athanase Papadopoulos (Université de Strasbourg), ed.
IRMA Lectures in Mathematics and Theoretical Physics

Hurwitz’s Lectures on the Number Theory of Quaternions
Nicola Oswald (Bergische Universität Wuppertal) and Jörn Steuding (Universität Würzburg)
Heritage of European Mathematics

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Alessio Figalli and Federico Glaudo (both ETH Zürich)
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Piotr W. Nowak (IM PAN) and Guoliang Yu (Texas A&M University)
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Karl H. Hofmann (Technische Universität Darmstadt and Tulane University) and Sidney A. Morris (Federation University Australia and La Trobe University)
EMS Tracts in Mathematics

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