

EMS Textbooks in Mathematics

The *EMS Textbooks in Mathematics* is a series of books aimed at students or professional mathematicians seeking an introduction into a particular field. The individual volumes are intended not only to provide relevant techniques, results, and applications, but also to afford insight into the motivations and ideas behind the theory. Suitably designed exercises help to master the subject and prepare the reader for the study of more advanced and specialized literature.

Previously published in this series:

Peter Kunkel and Volker Mehrmann, Differential-Algebraic Equations

Markus Stroppel, Locally Compact Groups

Dorothee D. Haroske and Hans Triebel, Distributions, Sobolev Spaces, Elliptic Equations

Thomas Timmermann, An Invitation to Quantum Groups and Duality

Oleg Bogopolski, Introduction to Group Theory

Marek Jarnicki and Peter Pflug, First Steps in Several Complex Variables: Reinhardt Domains

Tammo tom Dieck, Algebraic Topology

Mauro C. Beltrametti et al., Lectures on Curves, Surfaces and Projective Varieties

Wolfgang Woess, Denumerable Markov Chains

Eduard Zehnder, Lectures on Dynamical Systems

Andrzej Skowroński and Kunio Yamagata, Frobenius Algebras I

Piotr W. Nowak and Guoliang Yu, Large Scale Geometry

Joaquim Bruna and Juliá Cufí, Complex Analysis

Eduardo Casas-Alvero, Analytic Projective Geometry

Fabrice Baudoin, Diffusion Processes and Stochastic Calculus

Olivier Lablée, Spectral Theory in Riemannian Geometry

Dietmar A. Salamon, Measure and Integration

Andrzej Skowroński and Kunio Yamagata, Frobenius Algebras II

Jørn Justesen and Tom Høholdt, A Course In Error-Correcting Codes (2nd ed.)

Bogdan Nica, A Brief Introduction to Spectral Graph Theory

Timothée Marquis, An Introduction to Kac-Moody Groups over Fields

Alessio Figalli and Federico Glaudo, An Invitation to Optimal Transport, Wasserstein Distances, and Gradient Flows

Piermarco Cannarsa and Filippo Gazzola, Dynamic Optimization for Beginners

Alain Bretto, Alain Faisant, and François Hennecart, Elements of Graph Theory

Alessio Figalli
Federico Glaudo
An Invitation to
Optimal Transport,
Wasserstein Distances,
and Gradient Flows
Second Edition



Authors

Alessio Figalli Federico Glaudo

Department of Mathematics School of Mathematics

ETH Zürich Institute for Advanced Study

Rämistrasse 101 Einstein Drive 1

8092 Zürich, Switzerland Princeton, NJ 08540, USA Email: alessio.figalli@math.ethz.ch Email: fglaudo@ias.edu

2020 Mathematics Subject Classification: 49Q22; 60B05, 28A33, 35A15, 35Q35, 49N15, 28A50

Keywords: optimal transport, Wasserstein distance, duality, gradient flows, measure theory,

displacement convexity

First edition published in 2021 by EMS Press.

ISBN 978-3-98547-050-1, eISBN 978-3-98547-550-6, DOI 10.4171/ETB/25

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.dnb.de.

Published by EMS Press, an imprint of the

European Mathematical Society – EMS – Publishing House GmbH Institut für Mathematik Technische Universität Berlin Straße des 17. Juni 136 10623 Berlin, Germany

https://ems.press

© 2023 EMS Press

Typesetting: Alison Durham, Manchester, UK Printed in Germany ⊚ Printed on acid free paper