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GEOMETRIC INVERSE PROBLEMS

This up-to-date treatment of recent developments in geometric inverse problems introduces graduate students and researchers to an exciting area of research. With an emphasis on the two-dimensional case, topics covered include geodesic X-ray transforms, boundary rigidity, tensor tomography, attenuated X-ray transforms, and the Calderón problem.

The presentation is self-contained and begins with the Radon transform and radial sound speeds as motivating examples. The required geometric background is developed in detail in the context of simple manifolds with boundary. An in-depth analysis of various geodesic X-ray transforms is carried out together with related uniqueness, stability, reconstruction, and range characterization results. Highlights include a proof of boundary rigidity for simple surfaces as well as scattering rigidity for connections. The concluding chapter discusses current open problems and related topics. The numerous exercises and examples make this book an excellent self-study resource or text for a one-semester course or seminar.

Gabriel P. Paternain is Professor of Mathematics at the Department of Pure Mathematics and Mathematical Statistics at the University of Cambridge and a Fellow of Trinity College. His research has covered an ample mathematical landscape, including Hamiltonian dynamics, symplectic geometry, and geometric inverse problems. He is the author of the monograph *Geodesic Flows* (1999), and was awarded the Pilkington Teaching Prize at Cambridge for his ability to explain analysis and geometry with a clarity that has won him the admiration and respect of his students.

Mikko Salo is Professor of Mathematics at the University of Jyväskylä, Finland. He has received several awards for his work on inverse problems in partial differential equations and geometry, including the Calderón prize, the Väisälä prize, an ERC Starting Grant, and an ERC Consolidator Grant.

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Published online by Cambridge University Press

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Geometric Inverse Problems

With Emphasis on Two Dimensions

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CAMBRIDGE
UNIVERSITY PRESS

Published online by Cambridge University Press

CAMBRIDGE
UNIVERSITY PRESS

Shaftesbury Road, Cambridge CB2 8EA, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India

103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment,
a department of the University of Cambridge.

We share the University's mission to contribute to society through the pursuit of
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www.cambridge.org
Information on this title: www.cambridge.org/9781316510872

DOI: 10.1017/9781009039901

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First published 2023

A catalogue record for this publication is available from the British Library.

Library of Congress Cataloging-in-Publication Data
Names: Paternain, Gabriel P. (Gabriel Pedro), 1964– author. |
Salo, Mikko, author. | Uhlmann, Gunther, 1952– author.
Title: Geometric inverse problems : with emphasis on two dimensions /
Gabriel P. Paternain, Mikko Salo, Gunther Uhlmann.
Description: Cambridge ; New York, NY : Cambridge University Press, 2023. |
Series: Cambridge studies in advanced mathematics, 0950-6330 ; 204 |
Includes bibliographical references and index.
Identifiers: LCCN 2022030681 (print) | LCCN 2022030682 (ebook) |
ISBN 9781316510872 (hardback) | ISBN 9781009039901 (epub)
Subjects: LCSH: Inverse problems (Differential equations) |
Inversions (Geometry) | Geometry, Differential.
Classification: LCC QA378.5 .P38 2023 (print) | LCC QA378.5 (ebook) |
DDC 515/.357–dc23/eng20221013
LC record available at https://lccn.loc.gov/2022030681
LC ebook record available at https://lccn.loc.gov/2022030682

ISBN 978-1-316-51087-2 Hardback

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