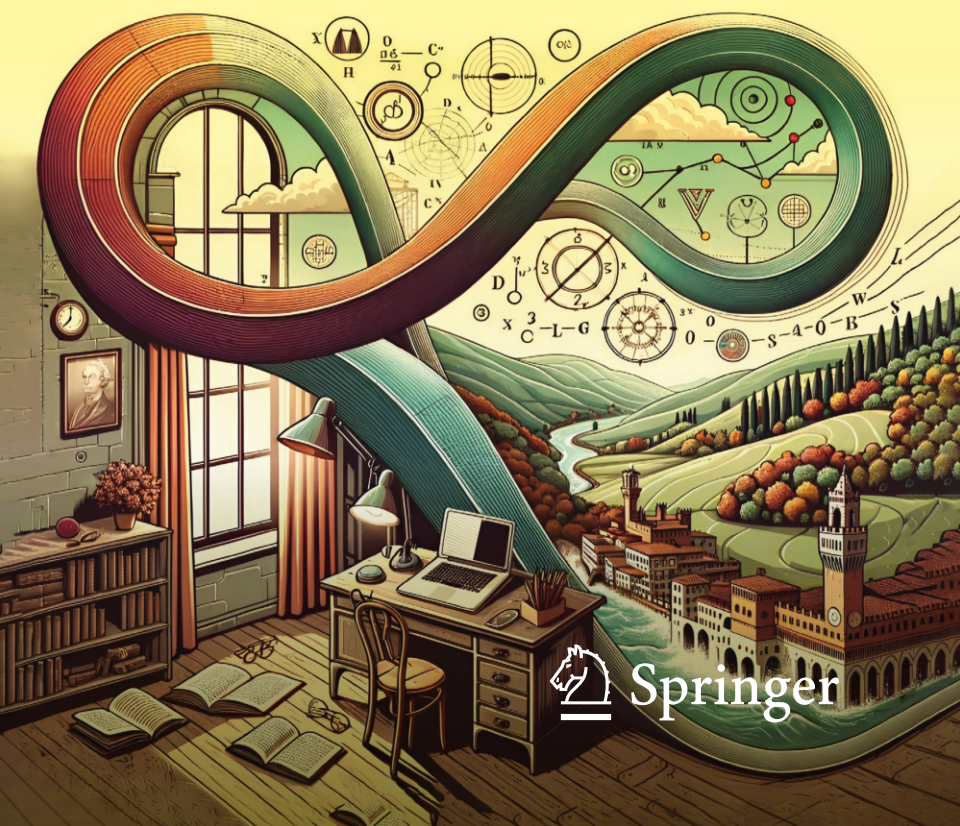


Luigi Ambrosio
Alfio Quarteroni *Editors*

Conversations on Optimal Transport



Springer

Conversations on Optimal Transport

Luigi Ambrosio • Alfio Quarteroni
Editors

Conversations on Optimal Transport

 Springer

Editors

Luigi Ambrosio
Scuola Normale Superiore
Pisa, Italy

Alfio Quarteroni
Politecnico di Milano
Milano, Italy

EPFL, Lausanne, Switzerland

ISBN 978-3-031-51684-9 ISBN 978-3-031-51685-6 (eBook)
<https://doi.org/10.1007/978-3-031-51685-6>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2024

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Specifically created for this book via an AI tool

This Springer imprint is published by the registered company Springer Nature Switzerland AG

The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

If disposing of this product, please recycle the paper.

Foreword

From Webinars to Podcasts to Books

This book gems from an idea born in 2020 during the lockdown that affected the whole world, changing our lives, our habits, our daily routines, and our business models for ever.

At that time, the reader might remember that all the meetings and conferences planned had to be cancelled or postponed. Therefore, with some colleagues from the mathematics journal department at Springer, we decided to start a series of SN conferences, which basically consisted of offering to the journals and books Editorial Boards we cooperate with the possibility of hosting and coordinating virtual conferences, so as not to interrupt the dissemination of research results.

In the following years, when everything returned to the so-called “new normality”, we stopped organizing online conferences, and we further developed the concept by launching the **SN webinars**, a series of branded virtual interviews and webinars involving either top Springer authors or Key Opinion Leaders in a certain field.

In this contest, I (as Executive Editor, Mathematics, Books division at Springer) involved the Board members of a successful Springer textbook series in mathematics—UNITEXT—which is rather well-known at an international level. We decided to start a series of interviews that are handled by the UNITEXT Board members, who would rotate to interview top experts in their field.

The starting point is the topic faced in a textbook, and the discussion then expands and covers more general topics related to the research and the personal history of the guest speaker. The audience is invited to interact with the speakers, and it is expected to ask questions and further develop the discussion.

The result is a series of video recordings, mainly focusing on a very hot topic: Optimal Transport. These conversations involve not only authors from the UNITEXT series, but also members of the book series' Editorial Board. Additionally, they feature prominent figures in the field, including a Field Medalist.

At that point, we realized that we had high-quality material in our hands; therefore, we had the idea to generate new content working on these video recordings and creating audio **PODCASTS** out of them. These PODCASTS are already available on our dedicated channel: <https://springer-mathpodcast.buzzsprout.com/>.

The following step bloomed rather naturally: we moved forward to publish a book out of the PODCASTS. Subsequently, advanced AI tools were employed—under human supervision—to transcribe the audios and edit them for better readability.

It is important to note that the content in each format—the interviews, the PODCASTS, and the book—is self-contained and not a mere adaptation from one medium to another. Instead, it represents an independent exploration of the subject matter.

This book can be considered the result of excellent synergies between Springer Editors and prominent Springer authors, with the support of sophisticated artificial intelligence (AI) tools.

For a few months, we have all been talking or hearing about the AI ability to answer complex questions, write songs, generate codes, translate languages, and—as in this specific case—produce scripts from audio recordings.

Because of the infinite multiple uses that open before us, many perceive the impact of AI as inevitable and potentially threatening. Nothing new: every time in human history when a new technology has entered our lives, it has led to a revolution: the agricultural, industrial, and information technology ones. These revolutions resulted in the elimination of heavy and repetitive work with little cognitive content, but at the same time they created new jobs. Now, thanks to what is called *machine learning*—which focuses on the use of data and algorithms to imitate the way that humans learn and steadily enhances its precision over time—we can automate tasks and processes, reducing the time and effort needed for various activities. Human intelligence plays a unique role here; artificial intelligence algorithms can solve problems, but their precise and accurate formulation is vital and is in our hands. Therefore, the human touch is fundamental in this process, concentrating on problem formulation to obtain an effective result.

Let us contextualize this concept: we managed to create the image on the cover using one of the many AI tools available, DALL-E 3. We asked it to represent some Italian mathematicians talking about some specific topics related to mathematics, AI, and Optimal Transport. We refined and rephrased the request 20 times to obtain a result close to what we had in mind. Here is the request we originally