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2017 MATRIX Annals
Sobolev Maps to the Circle
Optimal Transport Methods in Economics
Computational Optimal Transport
Applied Mathematical Models in Human Physiology
Topics in Optimal Transportation
Analysis on Polish Spaces and an Introduction to Optimal Transportation
An Excursion Through Discrete Differential Geometry
Geometric Inequalities
Optimal Transportation Networks
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Optimal Transportation
Optimal Transport

AUGUST AYDIN

Practical Applied Mathematics Cambridge University Press
Drawing from a wide variety of mathematical subjects, this book aims to show how mathematics is realised in practice in the everyday world. Dozens of applications are used to show that applied mathematics is much more than a series of academic calculations. Mathematical topics covered include distributions, ordinary and partial differential equations, and asymptotic methods as well as basics of modelling. The range of applications is similarly varied, from the modelling of hair to piano tuning, egg incubation and traffic flow. The style is informal but not superficial. In addition, the text is supplemented by a large number of exercises and sideline discussions, assisting the reader's grasp of the material. Used either in the classroom by upper-undergraduate students, or as extra reading for any applied mathematician, this book illustrates how the reader's knowledge can be used to describe the world around them.
Optimal Transport Courier Corporation
Lecture notes and research papers on optimal transportation, its applications, and interactions with other areas of mathematics.
Optimal Transport Springer Science & Business Media
MATRIX is Australia’s international and residential mathematical research institute. It facilitates new collaborations and mathematical advances through intensive residential research programs, each 1-4 weeks in duration. This book is a scientific

record of the eight programs held at MATRIX in its second year, 2017: - Hypergeometric Motives and Calabi–Yau Differential Equations - Computational Inverse Problems - Integrability in Low-Dimensional Quantum Systems - Elliptic Partial Differential Equations of Second Order: Celebrating 40 Years of Gilbarg and Trudinger's Book - Combinatorics, Statistical Mechanics, and Conformal Field Theory - Mathematics of Risk - Tutte Centenary Retreat - Geometric R-Matrices: from Geometry to Probability The articles are grouped into peer-reviewed contributions and other contributions. The peer-reviewed articles present original results or reviews on a topic related to the MATRIX program; the remaining contributions are predominantly lecture notes or short articles based on talks or activities at MATRIX.

Optimal Transport World Scientific

This is the first comprehensive introduction to the theory of mass transportation with its many—and sometimes unexpected—applications. In a novel approach to the subject, the book both surveys the topic and includes a chapter of problems, making it a particularly useful graduate textbook. In 1781, Gaspard Monge defined the problem of "optimal transportation" (or the transferring of mass with the least possible amount of work), with applications to engineering in mind. In 1942, Leonid Kantorovich applied the newborn machinery of linear programming to Monge's problem, with applications to economics in mind. In 1987, Yann Brenier used optimal transportation to prove a new projection theorem on the set of measure preserving maps, with applications to fluid mechanics in mind. Each of these contributions marked the beginning of a whole mathematical theory, with many unexpected ramifications. Nowadays, the Monge-Kantorovich problem is used and studied by researchers from extremely diverse horizons, including probability theory, functional analysis, isoperimetry, partial differential equations, and even meteorology. Originating from a graduate course, the present volume is intended for graduate students and researchers, covering both theory and applications. Readers are only assumed to be familiar with the basics of measure theory and functional analysis.

Model-free Hedging ScholarlyEditions

A comprehensive introduction to optimization with a focus on practical algorithms for the design of engineering systems. This book offers a comprehensive introduction to optimization with a focus on practical algorithms. The book approaches optimization from an engineering perspective, where the objective is to design a system that optimizes a set of metrics subject to constraints. Readers will learn about computational approaches for a range of challenges, including searching high-dimensional spaces, handling problems where there are multiple competing objectives, and accommodating uncertainty in the metrics. Figures, examples, and exercises convey the intuition behind the mathematical approaches. The text provides concrete implementations in the Julia programming language. Topics covered include derivatives and their generalization to multiple dimensions; local descent and first- and second-order methods that inform local descent; stochastic methods, which introduce randomness into the optimization process; linear constrained optimization, when both the objective function and the constraints are linear; surrogate models, probabilistic surrogate models, and using probabilistic surrogate models to guide

optimization; optimization under uncertainty; uncertainty propagation; expression optimization; and multidisciplinary design optimization. Appendixes offer an introduction to the Julia language, test functions for evaluating algorithm performance, and mathematical concepts used in the derivation and analysis of the optimization methods discussed in the text. The book can be used by advanced undergraduates and graduate students in mathematics, statistics, computer science, any engineering field, (including electrical engineering and aerospace engineering), and operations research, and as a reference for professionals.

Lectures on Optimal Transport Princeton University Press

Detailed account of analysis on Polish spaces with a straightforward introduction to optimal transportation.

Variational Methods Chapman & Hall/CRC

The book provides an introduction to sub-Riemannian geometry and optimal transport and presents some of the recent progress in these two fields. The text is completely self-contained: the linear discussion, containing all the proofs of the stated results, leads the reader step by step from the notion of distribution at the very beginning to the existence of optimal transport maps for Lipschitz sub-Riemannian structure. The combination of geometry presented from an analytic point of view and of optimal transport, makes the book interesting for a very large community. This set of notes grew from a series of lectures given by the author during a CIMPA school in Beirut, Lebanon.

Model-free Hedging SIAM

This book challenges the views put forward by Pierre Cartier, one of the anchors of the famous Bourbaki group, and Cédric Villani, one of the most brilliant mathematicians of his generation, who received the Fields Medal in 2010. Jean Dhombres, mathematician and science historian, and Gerhard Heinzmann, philosopher of science and also a specialist in mathematics engage in a fruitful dialogue with the two mathematicians, prompting readers to reflect on mathematical activity and its social consequences in history as well as in the modern world. Cédric Villani's popular success proves once again that a common awareness has developed, albeit in a very confused way, of the major role of mathematics in the construction and efficiency of natural sciences, which are at the origin of our technologies. Despite this, the idea that mathematics cannot be shared remains firmly entrenched, a perceived failing that has even been branded a lack of culture by vocal forces in the media as well as cultural and political establishment. The authors explore three major directions in their dialogue: the highly complex relationship between mathematics and reality, the subject of many debates and opposing viewpoints; the freedom that the construction of mathematics has given humankind by enabling them to develop the natural sciences as well as mathematical research; and the responsibility with which the scientific community and governments should address the role of mathematics in research and education policies.

Advanced Mathematics for Engineering Students Elsevier

In recent years flows in networks have attracted the interest of many researchers from different areas, e.g. applied mathematicians, engineers, physicists, economists. The main reason for this ubiquity is the wide and diverse range of applications, such as vehicular traffic, supply chains, blood flow, irrigation channels, data networks and others. This book presents

an extensive set of notes by world leaders on the main mathematical techniques used to address such problems, together with investigations into specific applications. The main focus is on partial differential equations in networks, but ordinary differential equations and optimal transport are also included. Moreover, the modeling is completed by analysis, numerics, control and optimization of flows in networks. The book will be a valuable resource for every researcher or student interested in the subject.

Modelling and Optimisation of Flows on Networks Cambridge University Press

Optimal Transport Methods in Economics is the first textbook on the subject written especially for students and researchers in economics. Optimal transport theory is used widely to solve problems in mathematics and some areas of the sciences, but it can also be used to understand a range of problems in applied economics, such as the matching between job seekers and jobs, the determinants of real estate prices, and the formation of matrimonial unions. This is the first text to develop clear applications of optimal transport to economic modeling, statistics, and econometrics. It covers the basic results of the theory as well as their relations to linear programming, network flow problems, convex analysis, and computational geometry. Emphasizing computational methods, it also includes programming examples that provide details on implementation. Applications include discrete choice models, models of differential demand, and quantile-based statistical estimation methods, as well as asset pricing models. Authoritative and accessible, Optimal Transport Methods in Economics also features numerous exercises throughout that help you develop your mathematical agility, deepen your computational skills, and strengthen your economic intuition. The first introduction to the subject written especially for economists Includes programming examples Features numerous exercises throughout Ideal for students and researchers alike

Optimal Transport for Applied Mathematicians Walter de Gruyter GmbH & Co KG

Differential equations are the basis for models of any physical systems that exhibit smooth change. This book combines much of the material found in a traditional course on ordinary differential equations with an introduction to the more modern theory of dynamical systems. Applications of this theory to physics, biology, chemistry, and engineering are shown through examples in such areas as population modeling, fluid dynamics, electronics, and mechanics.? Differential Dynamical Systems begins with coverage of linear systems, including matrix algebra; the focus then shifts to foundational material on nonlinear differential equations, making heavy use of the contraction-mapping theorem. Subsequent chapters deal specifically with dynamical systems concepts?flow, stability, invariant manifolds, the phase plane, bifurcation, chaos, and Hamiltonian dynamics. This new edition contains several important updates and revisions throughout the book. Throughout the book, the author includes exercises to help students develop an analytical and geometrical understanding of dynamics. Many of the exercises and examples are based on applications and some involve computation; an appendix offers simple codes written in Maple?, Mathematica?, and MATLAB? software to give students practice

with computation applied to dynamical systems problems.
Differential Dynamical Systems, Revised Edition Springer Science & Business Media
Leading researchers in the field of Optimal Transportation, with different views and perspectives, contribute to this Summer School volume: Monge-Ampère and Monge-Kantorovich theory, shape optimization and mass transportation are linked, among others, to applications in fluid mechanics granular material physics and statistical mechanics, emphasizing the attractiveness of the subject from both a theoretical and applied point of view. The volume is designed to become a guide to researchers willing to enter into this challenging and useful theory.
Mass Transportation Problems Foundations and Trends(r) in M
Fresh, lively text serves as a modern introduction to the subject, with applications to the mechanics of systems with a finite number of degrees of freedom. Ideal for math and physics students.
Topological Optimization and Optimal Transport Butterworth-Heinemann
The book is devoted to the theory of gradient flows in the general framework of metric spaces, and in the more specific setting of the space of probability measures, which provide a surprising link between optimal transportation theory and many evolutionary PDE's related to (non)linear diffusion. Particular emphasis is given to the convergence of the implicit time discretization method and to the error estimates for this discretization, extending the well established theory in Hilbert spaces. The book is split in two main parts that can be read independently of each other.
Optimal Transport Springer Science & Business Media
This collection of articles covers the hottest topics in contemporary applied mathematics. Multiscale modeling, material computing, symplectic methods, parallel computing, mathematical biology, applied differential equations and engineering computing problems are all included. The book contains the latest results of many leading scientists and provides a window on new trends in research in the field.
Semi-Lagrangian Approximation Schemes for Linear and Hamilton-Jacobi Equations Springer Nature
Model-free Hedging: A Martingale Optimal Transport Viewpoint focuses on the computation of model-independent bounds for exotic options consistent with market prices of liquid instruments such as Vanilla options. The author gives an overview of Martingale Optimal Transport, highlighting the differences between the optimal transport and its martingale counterpart. This topic is then discussed in the context of mathematical finance.
Issues in Applied Mathematics: 2011 Edition Walter de Gruyter GmbH & Co KG
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Informed Urban Transport Systems Springer

The goal of Optimal Transport (OT) is to define geometric tools that are useful to compare probability distributions. Their use dates back to 1781. Recent years have witnessed a new revolution in the spread of OT, thanks to the emergence of approximate solvers that can scale to sizes and dimensions that are relevant to data sciences. Thanks to this newfound scalability, OT is being increasingly used to unlock various problems in imaging sciences (such as color or texture processing), computer vision and graphics (for shape manipulation) or machine learning (for regression, classification and density fitting). This monograph reviews OT with a bias toward numerical methods and their applications in data sciences, and sheds lights on the theoretical properties of OT that make it particularly useful for some of these applications. Computational Optimal Transport presents an overview of the main theoretical insights that support the practical effectiveness of OT before explaining how to turn these insights into fast computational schemes. Written for readers at all levels, the authors provide descriptions of foundational theory at two-levels. Generally accessible to all readers, more advanced readers can read the specially identified more general mathematical expositions of optimal transport tailored for discrete measures. Furthermore, several chapters deal with the interplay between continuous and discrete measures, and are thus targeting a more mathematically-inclined audience. This monograph will be a valuable reference for researchers and students wishing to get a thorough understanding of Computational Optimal Transport, a mathematical gem at the interface of probability, analysis and optimization.

Frontiers And Prospects Of Contemporary Applied Mathematics Springer Nature

Lecture notes and research papers on optimal transportation, its applications, and interactions with other areas of mathematics.

Optimal Transportation and Applications SIAM

The transportation problem can be formalized as the problem of finding the optimal way to transport a given measure into another with the same mass. In contrast to the Monge-Kantorovitch problem, recent approaches model the branched structure of such supply networks as minima of an energy functional whose essential feature is to favour wide roads. Such a branched structure is observable in ground transportation networks, in draining and irrigation systems, in electrical power supply systems and in natural counterparts such as blood vessels or the branches of trees. These lectures provide mathematical proof of several existence, structure and regularity properties empirically observed in transportation networks. The link with previous discrete physical models of irrigation and erosion models in geomorphology and with discrete telecommunication and transportation models is discussed. It will be mathematically proven that the majority fit in the simple model sketched in this volume.

• Brown Bear, Brown Bear, What Do You See?
• Kindergarten, Here I Come!
• The Light We Carry: Overcoming In Uncertain Times
• World Of Eric Carle, Around The Farm 30-button Animal Sound Book - Great For First Words - Pi Kids By Pi Kids
• How To Catch A Mermaid By Adam Wallace
• The Inmate: A Gripping Psychological Thriller
• Iron Flame (the Empyrean, 2)
• The Wonderful Things You Will Be By Emily Winfield Martin