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Nota di contenuto	Introduction -- Part I: Parameterized Tractability -- Preliminaries -- The Basic Definitions -- Part II: Elementary Positive Techniques -- Bounded Search Trees -- Kernelization -- More on Kernelization -- Iterative Compression, and Measure and Conquer, for Minimization Problems -- Further Elementary Techniques -- Colour Coding, Multilinear Detection, and Randomized Divide and Conquer -- Optimization Problems, Approximation Schemes, and Their Relation to FPT -- Part III: Techniques Based on Graph Structure -- Treewidth and Dynamic Programming -- Heuristics for Treewidth -- Automata and Bounded Treewidth -- Courcelle's Theorem -- More on Width-Metrics: Applications and Local Treewidth -- Depth-First Search and the Plehn-Voigt Theorem -- Other Width Metrics -- Part IV: Exotic Meta-Techniques -- Well-Quasi-Orderings and the Robertson-Seymour Theorems -- The Graph Minor Theorem -- Applications of the Obstruction Principle and WQOs -- Part V: Hardness Theory -- Reductions -- The Basic Class W[1] and an Analog of Cook's Theorem -- Other Hardness Results -- The W-Hierarchy -- The Monotone and Antimonotone Collapses -- Beyond W-Hardness -- k-Move Games -- Provable Intractability: The Class XP -- Another Basis -- Part VI: Approximations, Connections, Lower Bounds -- The M-Hierarchy, and XP-optimality -- Kernelization Lower Bounds -- Part VII: Further Topics -- Parameterized Approximation -- Parameterized Counting and

Sommario/riassunto

The field of parameterized complexity/multivariate complexity algorithmics is an exciting and vibrant part of theoretical computer science, responding to the vital need for efficient algorithms in modern society. This comprehensive and self-contained textbook presents an accessible overview of the state of the art of multivariate algorithmics and complexity. Increasingly, multivariate algorithmics is having significant practical impact in many application domains, with even more developments on the horizon. The text describes how the multivariate framework allows an extended dialog with a problem, enabling the reader who masters the complexity issues under discussion to use the positive and negative toolkits in their own research. Topics and features: Describes many of the standard algorithmic techniques available for establishing parametric tractability Reviews the classical hardness classes Explores the various limitations and relaxations of the methods Showcases the powerful new lower bound techniques Examines various different algorithmic solutions to the same problems, highlighting the insights to be gained from each approach Demonstrates how complexity methods and ideas have evolved over the past 25 years This classroom-tested and easy-to-follow textbook/reference is essential reading for the beginning graduate student and advanced undergraduate student. The book will also serve as an invaluable resource for the general computer scientist and the mathematically-aware scientist seeking tools for their research.
