PARAMETERIZED COMPLEXITY

R.G. Downey
M.R. Fellows

Springer

Parameterized Complexity Monographs In Computer Science

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Parameterized Complexity Monographs In Computer Science:

Parameterized Complexity Rodney G. Downey,M.R. Fellows,2012-12-06 The idea for this book was conceived over the second bottle of Villa Maria s Caber net Medot 89 at the dinner of the Australasian Combinatorics Conference held at Palmerston North New Zealand in December 1990 where the authors first met and discovered they had a number of interests in common Initially we embarked on a small project to try to formulate reductions to address the apparent parame terized intractability of DOMINATING SET and to introduce a structure in which to frame our answers Having spent several months trying to get the definitions for the reductions right they now seem so obvious we turned to our tattered copies of Garey and Johnson s work 239 We were stunned to find that virtually none of the classical reductions worked in the parameterized setting We then wondered if we d be able to find any interesting reductions Several years many more bottles so many papers and reductions later it 3 seemed that we had unwittingly stumbled upon what we believe is a truly central and new area of complexity theory It seemed to us that the material would be of great interest to people working in areas where exact algorithms for a small range of parameters are natural and useful e g Molecular Biology VLSI design The tractability theory was rich with distinctive and powerful techniques The intractability theory seemed to have a deep structure and techniques all of its own **SOFSEM 2015: Theory and Practice of Computer Science** Giuseppe Italiano,Tiziana Margaria-Steffen,Jaroslav Pokorný,Jean-Jacques Quisquater,Roger Wattenhofer,2015-01-14 This book constitutes the proceedings of the 41st International Conference on Current Trends in Theory and Practice of Computer Science held in Pec pod Sn kou Czech Republic during January 24 29 2015 The book features 8 invited talks and 42 regular papers which were carefully reviewed and selected from 101 submissions The papers are organized in topical sections named foundations of computer science software and Web engineering data information and knowledge engineering and cryptography security and verification *Parameterized Complexity* Rodney G. Downey,M.R. Fellows,Michael Ralph Fellows,1999 This monograph presents an approach to complexity theory which offers a means of analyzing algorithms in terms of their tractability The authors consider the problem in terms of parameterized languages and taking k slices of the language In doing so the reader is introduced to new classes of algorithms which may be analyzed more precisely than heretofore The authors have made the book as self contained as possible and a lot of background material is included As a result computer scientists mathematicians and graduate students interested in the design and analysis of algorithms will find much of interest in this book Graph-Theoretic Concepts in Computer Science Dimitrios M. Thilikos,2010 WG has a long tradition Rainbow of Computer Science Cristian S. Calude,Grzegorz Rozenberg,Arto Salomaa,2011-03-22 This volume is dedicated to Hermann Maurer on his 70th birthday Topics include Automata Formal Languages and Computability to various aspects of the Practice of Computer Science as well as from Algorithmics to Learning **Parameterized Complexity Theory** J. Flum,M. Grohe,2006-05-01 Parameterized complexity theory is a recent branch of computational complexity theory that provides a

framework for a refined analysis of hard algorithmic problems The central notion of the theory fixed parameter tractability has led to the development of various new algorithmic techniques and a whole new theory of intractability This book is a state of the art introduction to both algorithmic techniques for fixed parameter tractability and the structural theory of parameterized complexity classes and it presents detailed proofs of recent advanced results that have not appeared in book form before Several chapters are each devoted to intractability algorithmic techniques for designing fixed parameter tractable algorithms and bounded fixed parameter tractability and subexponential time complexity The treatment is comprehensive and the reader is supported with exercises notes a detailed index and some background on complexity theory and logic The book will be of interest to computer scientists mathematicians and graduate students engaged with algorithms and problem complexity   *Fundamentals of Parameterized Complexity* Rodney G. Downey,Michael R. Fellows,2013-12-03 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 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   **Principles and Practice of Constraint Programming -- CP 2011** Jimmy Lee,2011-09-02 This book constitutes the refereed proceedings of the 17th International Conference on Principles and Practice of Constraint Programming CP 2011 held in Perugia Italy September 12 16 2011 The 51 revised full papers and 7 short papers presented together with three invited talks were carefully reviewed and selected from 159 submissions The papers are organized in topical sections on algorithms environments languages models and systems applications such as decision making resource allocation and agreement technologies   **Trends in Computational Social Choice** Ulle Endriss,2017 Computational social choice is concerned with the design and analysis of methods for collective decision making It is a research area that is located at the interface of computer science and economics The central question studied in computational social choice is that of how best to aggregate the individual points of view of several agents so as to arrive at a reasonable compromise Examples include tallying the votes cast in an election aggregating the professional opinions of several experts and finding a fair manner of dividing a set of resources amongst the members of a group Back cover   **Graph-Theoretic Concepts in Computer Science** Łukasz Kowalik,Michał Pilipczuk,Paweł Rzążewski,2021-09-20 This book constitutes the proceedings of the 47th International Workshop on Graph Theoretic Concepts in Computer Science

which was held during June 23 25 2021 The conference was planned to take place in Warsaw Poland but changed to an online event due to the COVID 19 pandemic The 30 full papers included in this volume were carefully reviewed and selected from 73 submissions The conference aims to merge theory and practice by demonstrating how concepts from graph theory can be applied to various areas in computer science or by extracting new graph theoretic problems from applications Chapter Bears with Hats and Independence Polynomials is are available open access under a Creative Commons Attribution 4 0 International License via link springer com Chapters 1 6 and 22 are available open access under a Creative Commons Attribution 4 0 International License via link springer com *Graph-theoretic Concepts in Computer Science* ,2004 **The Multivariate Algorithmic Revolution and Beyond** Hans L. Bodlaender,Rodney Downey,Fedor V. Fomin,Dániel Marx,2012-06-16 Parameterized complexity is currently a thriving field in complexity theory and algorithm design A significant part of the success of the field can be attributed to Michael R Fellows This Festschrift has been published in honor of Mike Fellows on the occasion of his 60th birthday It contains 20 papers that showcase the important scientific contributions of this remarkable man describes the history of the field of parameterized complexity and also reflects on other parts of Mike Fellows s unique and broad range of interests including his work on the popularization of discrete mathematics for young children The volume contains several surveys that introduce the reader to the field of parameterized complexity and discuss important notions results and developments in this field **Handbook of Graph Theory, Combinatorial Optimization, and Algorithms** Krishnaiyan "KT" Thulasiraman,Subramanian Arumugam,Andreas Brandstädt,Takao Nishizeki,2016-01-05 The fusion between graph theory and combinatorial optimization has led to theoretically profound and practically useful algorithms yet there is no book that currently covers both areas together Handbook of Graph Theory Combinatorial Optimization and Algorithms is the first to present a unified comprehensive treatment of both graph theory and c **Parameterized Complexity in the Polynomial Hierarchy** Ronald de Haan,2019-12-30 Parameterized Complexity in the Polynomial Hierarchy was co recipient of the E W Beth Dissertation Prize 2017 for outstanding dissertations in the fields of logic language and information This work extends the theory of parameterized complexity to higher levels of the Polynomial Hierarchy PH For problems at higher levels of the PH a promising solving approach is to develop fixed parameter tractable reductions to SAT and to subsequently use a SAT solving algorithm to solve the problem In this dissertation a theoretical toolbox is developed that can be used to classify in which cases this is possible The use of this toolbox is illustrated by applying it to analyze a wide range of problems from various areas of computer science and artificial intelligence *Algorithms and Data Structures* ,2005 *Algorithms* ,2005 **Algorithmics for Hard Problems** Juraj Hromkovič,2001-05-22 An introduction to the methods of designing algorithms for hard computing tasks concentrating mainly on approximate randomized and heuristic algorithms and on the theoretical and experimental comparison of these approaches according to the requirements of the practice This is the first book to systematically explain and compare all the

main possibilities of attacking hard computing problems It also closes the gap between theory and practice by providing at once a graduate textbook and a handbook for practitioners dealing with hard computing problems   **Proceedings of the 2000 Congress on Evolutionary Computation** ,2000   The Bulletin of Symbolic Logic ,2002   **Proceedings of the ... Congress on Evolutionary Computation** ,2000

Reviewing **Parameterized Complexity Monographs In Computer Science**: Unlocking the Spellbinding Force of Linguistics

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