

COMBINATORIAL OPTIMIZATION

The Quadratic Assignment Problem Theory and Algorithms

Eranda Çela

Springer-Science+Business Media, B.V.

Quadratic Assignment Problem Theory And Algorithms

Martin Groetschel



Quadratic Assignment Problem Theory And Algorithms:

The Quadratic Assignment Problem E. Cela, 2013-03-14 The quadratic assignment problem QAP was introduced in 1957 by Koopmans and Beckmann to model a plant location problem Since then the QAP has been object of numerous investigations by mathematicians computers scientists operations researchers and practitioners Nowadays the QAP is widely considered as a classical combinatorial optimization problem which is still attractive from many points of view In our opinion there are at least three main reasons which make the QAP a popular problem in combinatorial optimization First the number of real life problems which are mathematically modeled by QAPs has been continuously increasing and the variety of the fields they belong to is astonishing To recall just a restricted number among the applications of the QAP let us mention placement problems scheduling manufacturing VLSI design statistical data analysis and parallel and distributed computing Secondly a number of other well known combinatorial optimization problems can be formulated as QAPs Typical examples are the traveling salesman problem and a large number of optimization problems in graphs such as the maximum clique problem the graph partitioning problem and the minimum feedback arc set problem Finally from a computational point of view the QAP is a very difficult problem The QAP is not only NP hard and hard to approximate but it is also practically intractable it is generally considered as impossible to solve to optimality QAP instances of size larger than 20 within reasonable time limits *The Quadratic Assignment Problem* E. Cela, 2014-01-15 *Assignment Problems, Revised Reprint* Rainer Burkard, Mauro Dell'Amico, Silvano Martello, 2012-10-31 *Assignment Problems* is a useful tool for researchers practitioners and graduate students In 10 self contained chapters it provides a comprehensive treatment of assignment problems from their conceptual beginnings through present day theoretical algorithmic and practical developments The topics covered include bipartite matching algorithms linear assignment problems quadratic assignment problems multi index assignment problems and many variations of these Researchers will benefit from the detailed exposition of theory and algorithms related to assignment problems including the basic linear sum assignment problem and its variations Practitioners will learn about practical applications of the methods the performance of exact and heuristic algorithms and software options This book also can serve as a text for advanced courses in areas related to discrete mathematics and combinatorial optimisation The revised reprint provides details on a recent discovery related to one of Jacobi's results new material on inverse assignment problems and quadratic assignment problems and an updated bibliography *The Quadratic Assignment Problem* Rainer E. Burkard, Eranda Çela, Panos M. Pardalos, Leonidas S. Pitsoulis, 1998 *Towards a New Evolutionary Computation* Jose A. Lozano, 2006-01-12 *Estimation of Distribution Algorithms* EDAs are a set of algorithms in the Evolutionary Computation EC field characterized by the use of explicit probability distributions in optimization Contrarily to other EC techniques such as the broadly known Genetic Algorithms GAs in EDAs the crossover and mutation operators are substituted by the sampling of a distribution previously learnt from the selected individuals EDAs have experienced a high development that has

transformed them into an established discipline within the EC field This book attracts the interest of new researchers in the EC field as well as in other optimization disciplines and that it becomes a reference for all of us working on this topic The twelve chapters of this book can be divided into those that endeavor to set a sound theoretical basis for EDAs those that broaden the methodology of EDAs and finally those that have an applied objective **The Sharpest Cut** Martin

Groetschel,2004-01-01 This title is written in honor of Manfred Padberg who has made fundamental contributions to both the theoretical and computational sides of integer programming and combinatorial optimization This outstanding collection presents recent results in these areas that are closely connected to Padberg s research His deep commitment to the geometrical approach to combinatorial optimization can be felt throughout this volume his search for increasingly better and computationally efficient cutting planes gave rise to its title The peer reviewed papers contained here are based on invited lectures given at a workshop held in October 2001 to celebrate Padberg s 60th birthday Grouped by topic packing stable sets and perfect graphs polyhedral combinatorics general polytopes semidefinite programming computation many of the papers set out to solve challenges set forth in Padberg s work The book also shows how Padberg s ideas on cutting planes have influenced modern commercial optimization software Evolutionary Computation in Combinatorial Optimization Jens

Gottlieb,Günther Raidl,2005-03-21 This book constitutes the refereed proceedings of the 5th European Conference on Evolutionary Computation in Combinatorial Optimization EvoCOP 2005 held in Lausanne Switzerland in March April 2005 The 24 revised full papers presented were carefully reviewed and selected from 66 submissions The papers cover evolutionary algorithms as well as related approaches like scatter search simulated annealing ant colony optimization immune algorithms variable neighborhood search hyperheuristics and estimation of distribution algorithms The papers deal with representations analysis of operators and fitness landscapes and comparison algorithms Among the combinatorial optimization problems studied are graph coloring quadratic assignment knapsack graph matching packing scheduling timetabling lot sizing and the traveling salesman problem Handbook on Semidefinite, Conic and Polynomial Optimization

Miguel F. Anjos,Jean B. Lasserre,2011-11-19 Semidefinite and conic optimization is a major and thriving research area within the optimization community Although semidefinite optimization has been studied under different names since at least the 1940s its importance grew immensely during the 1990s after polynomial time interior point methods for linear optimization were extended to solve semidefinite optimization problems Since the beginning of the 21st century not only has research into semidefinite and conic optimization continued unabated but also a fruitful interaction has developed with algebraic geometry through the close connections between semidefinite matrices and polynomial optimization This has brought about important new results and led to an even higher level of research activity This Handbook on Semidefinite Conic and Polynomial Optimization provides the reader with a snapshot of the state of the art in the growing and mutually enriching areas of semidefinite optimization conic optimization and polynomial optimization It contains a compendium of the recent research

activity that has taken place in these thrilling areas and will appeal to doctoral students young graduates and experienced researchers alike The Handbook s thirty one chapters are organized into four parts Theory covering significant theoretical developments as well as the interactions between conic optimization and polynomial optimization Algorithms documenting the directions of current algorithmic development Software providing an overview of the state of the art Applications dealing with the application areas where semidefinite and conic optimization has made a significant impact in recent years

Handbook of combinatorial optimization Dingzhu Du,Panos M. Pardalos,1998-12-15 Combinatorial or discrete optimization is one of the most active fields in the interface of operations research computer science and applied mathematics Combinatorial optimization problems arise in various applications including communications network design VLSI design machine vision air line crew scheduling corporate planning computer aided design and man ufacturing database query design cellular telephone frequency assignment constraint directed reasoning and computational biology Furthermore combinatorial optimization problems occur in many diverse areas such as linear and integer programming graph theory artificial intelligence and number theory All these problems when formulated mathematically as the minimization or maximization of a certain function defined on some domain have a commonality of discreteness Historically combinatorial optimization starts with linear programming Linear programming has an entire range of important applications including production planning and distribution personnel assignment finance alloca tion of economic resources circuit simulation and control systems Leonid Kantorovich and Tjalling Koopmans received the Nobel Prize 1975 for their work on the optimal allocation of resources Two important discover ies the ellipsoid method 1979 and interior point approaches 1984 both provide polynomial time algorithms for linear programming These algo rithms have had a profound effect in combinatorial optimization Many polynomial time solvable combinatorial optimization problems are special cases of linear programming e g matching and maximum flow In addi tion linear programming relaxations are often the basis for many approxi mation algorithms for solving NP hard problems e g dual heuristics Operations Research Proceedings 2001 Peter

Chamoni,Rainer Leisten,Alexander Martin,Joachim Minnemann,Hartmut Stadtler,2013-03-09 This volume contains the proceedings of the 200 I International Conference on Operations Research OR 2 01 held at the Gerhard Mercator University Duisburg September 3 5 2001 OR 200 1 was organized under the auspices of the German Society of Operations Research Gesellschaft f r Operations Research GOR e V The conference and the annual general meeting were attended by 360 participants from 20 countries The presentation of 220 papers was organized in 15 sections According to Duisburg as hosting city for this event OR 200 1 emphasized on contributions of OR in the areas of energy transport and traffk The program consisted of2 plenary lectures Reinhard Selten and J rg Hennerkes and 15 invited semiplenary lectures 97 papers were submitted for publication Following the advice of the section chairs the program committee decided to accept 59 papers for this volume The selected manuscripts will be published also in electronic form on the W orld Wide Web at <http://www.uni>

duisburg de or200 1 We want to thank all referees and authors for delivering their final manuscript in due time We are also grateful to the other members of the local organizing committee and especially to Stefan Krebs Corinna Schu and David Betge for the perfect conference management Roland D sing Ralph Gollmer and Steffen Stock supported us in editing the abstracts and the final version of this proceeding volume Last but not least thanks to all the assistants and student assistants for their operations on OR 2001 in Duisburg

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