

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos

New York University, NY, USA

Doug Tygar

University of California, Berkeley, CA, USA

Moshe Y. Vardi

Rice University, Houston, TX, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Thomas Erlebach Giuseppe Persiano (Eds.)

Approximation and Online Algorithms

Third International Workshop, WAOA 2005
Palma de Mallorca, Spain, October 6-7, 2005
Revised Papers



Springer

Volume Editors

Thomas Erlebach
University of Leicester
Department of Computer Science
University Road, Leicester, LE1 7RH, UK
E-mail: t.erlebach@mcs.le.ac.uk

Giuseppe Persiano
Università degli Studi di Salerno
Dipartimento di Informatica ed Applicazioni
Via S. Allende 2, 84081 Baronissi (SA), Italy
E-mail: giuper@dia.unisa.it

Library of Congress Control Number: 200692553

CR Subject Classification (1998): F.2.2, G.2.1-2, G.1.2, G.1.6, I.3.5, E.1

LNCS Sublibrary: SL 1 – Theoretical Computer Science and General Issues

ISSN	0302-9743
ISBN-10	3-540-32207-8 Springer Berlin Heidelberg New York
ISBN-13	978-3-540-32207-8 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springer.com

© Springer-Verlag Berlin Heidelberg 2006
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11671411 06/3142 5 4 3 2 1 0

Preface

The third Workshop on Approximation and Online Algorithms (WAOA 2005) focused on the design and analysis of algorithms for online and computationally hard problems. Both kinds of problems have a large number of applications from a variety of fields. WAOA 2005 took place in Palma de Mallorca, Spain, on 6–7 October 2005. The workshop was part of the ALGO 2005 event that also hosted ESA, WABI, and ATMOS. The two previous WAOA workshops were held in Budapest (2003) and Rome (2004).

Topics of interest for WAOA 2005 were: algorithmic game theory, approximation classes, coloring and partitioning, competitive analysis, computational finance, cuts and connectivity, geometric problems, inapproximability results, mechanism design, network design, packing and covering, paradigms, randomization techniques, real-world applications, and scheduling problems. In response to the call for papers we received 68 submissions. Each submission was reviewed by at least three referees, and the vast majority by at least four referees. The submissions were mainly judged on originality, technical quality, and relevance to the topics of the conference. Based on the reviews, the Program Committee selected 26 papers.

We are grateful to Andrei Voronkov for providing the EasyChair conference system, which was used to manage the electronic submissions, the review process, and the electronic PC meeting. It made our task much easier.

We would also like to thank all the authors who submitted papers to WAOA 2005 as well as the local organizers of ALGO 2005.

November 2005

T. Erlebach
G. Persiano

Organization

Program Co-chairs

Thomas Erlebach	University of Leicester
Giuseppe Persiano	Università di Salerno

Program Committee

Evripidis Bampis	University of Evry
Markus Bläser	ETH Zürich
Thomas Erlebach	University of Leicester
Klaus Jansen	Universität Kiel
Christos Kaklamanis	University of Patras
Marc van Kreveld	Utrecht University
Pino Persiano	Università di Salerno
Guido Proietti	Università di L'Aquila
Kirk Pruhs	University of Pittsburgh
Yuval Rabani	Technion, Haifa
Adi Rosén	Technion, Haifa
Martin Skutella	Universität Dortmund
Roberto Solis-Oba	University of Western Ontario
Frits Spieksma	Katholieke Universiteit Leuven
Berthold Vöcking	RWTH Aachen

Referees

Helmut Alt	Joan Boyar	Jurriaan Hage
Ernst Althaus	Ioannis Caragiannis	Han Hoogeveen
Pasquale Ambrosio	Reuven Cohen	Sandy Irani
Eric Angel	José Correa	Panagiotis Kanellopoulos
Claudio Arbib	Yves Crama	Lasse Kliemann
Estie Arkin	Roberto De Prisco	Christian Knauer
Takao Asano	Florian Diedrich	Reinhard Koch
Vincenzo Auletta	Benjamin Doerr	Ronald Koch
Yossi Azar	Leah Epstein	Ekkehard Köhler
Fabien Baille	Aleksei Fishkin	Jochen Könemann
Reuven Bar-Yehuda	Luca Forlizzi	Alexander Kononov
Nadine Baumann	Stefan Funke	Elias Koutsoupias
Davide Bilò	Olga Gerber	Annamaria Kovacs
Vittorio Bilò	Laurent Gourvès	Sofia Kovaleva
Hans Bodlaender	Luciano Gualà	Darek Kowalski

VIII Organization

Christian Laforest
Van Bang Le
Stefano Leonardi
Gitta Marchand
Maren Martens
Giovanna Melideo
Joe Mitchell
Luca Moscardelli
Alfredo Navarra
René van Oostrum

Evi Papaioannou
Paolo Penna
L. Shankar Ram
Fabrizio Rossi
Guido Schäfer
Stefano Smriglio
Rob van Stee
Gerard Tel
Nicolas Thibault
Ralf Thöle

Csaba Tóth
Marc Uetz
Carmine Ventre
Tjark Vredeveld
Egon Wanke
Gerhard Woeginger
Guochuan Zhang
Michele Zito

Table of Contents

“Almost Stable” Matchings in the Roommates Problem <i>David J. Abraham, Péter Biró, David F. Manlove</i>	1
On the Minimum Load Coloring Problem <i>Nitin Ahuja, Andreas Baltz, Benjamin Doerr, Aleš Přívětivý, Anand Srivastav</i>	15
Improved Approximation Algorithms for MAX NAE-SAT and MAX SAT <i>Adi Avidor, Ido Berkovitch, Uri Zwick</i>	27
The Hardness of Network Design for Unsplittable Flow with Selfish Users <i>Yossi Azar, Amir Epstein</i>	41
Improved Approximation Algorithm for Convex Recoloring of Trees <i>Reuven Bar-Yehuda, Ido Feldman, Dror Rawitz</i>	55
Exploiting Locality: Approximating Sorting Buffers <i>Reuven Bar-Yehuda, Jonathan Laserson</i>	69
Approximate Fair Cost Allocation in Metric Traveling Salesman Games <i>M. Bläser, L. Shankar Ram</i>	82
Rounding of Sequences and Matrices, with Applications <i>Benjamin Doerr, Tobias Friedrich, Christian Klein, Ralf Osbild</i>	96
A Note on Semi-online Machine Covering <i>Tomáš Ebenlendr, John Noga, Jiří Sgall, Gerhard Woeginger</i>	110
SONET ADMs Minimization with Divisible Paths <i>Leah Epstein, Asaf Levin</i>	119
The Conference Call Search Problem in Wireless Networks <i>Leah Epstein, Asaf Levin</i>	133
Improvements for Truthful Mechanisms with Verifiable One-Parameter Selfish Agents <i>A. Ferrante, G. Parlato, F. Sorrentino, C. Ventre</i>	147
Symmetry in Network Congestion Games: Pure Equilibria and Anarchy Cost <i>Dimitris Fotakis, Spyros Kontogiannis, Paul Spirakis</i>	161

A Better-Than-Greedy Algorithm for k -Set Multicover <i>Toshihiro Fujito, Hidekazu Kurahashi</i>	176
Deterministic Online Optical Call Admission Revisited <i>Elisabeth Gassner, Sven O. Krumke</i>	190
Scheduling Parallel Jobs with Linear Speedup <i>Alexander Grigoriev, Marc Uetz</i>	203
Online Removable Square Packing <i>Xin Han, Kazuo Iwama, Guochuan Zhang</i>	216
The Online Target Date Assignment Problem <i>S. Heinz, S.O. Krumke, N. Megow, J. Rambau, A. Tuchscherer, T. Vredeveld</i>	230
Approximation and Complexity of k -Splittable Flows <i>Ronald Koch, Martin Skutella, Ines Spenke</i>	244
On Minimizing the Maximum Flow Time in the Online Dial-a-Ride Problem <i>Sven O. Krumke, Willem E. de Paepe, Diana Poensgen, Maarten Lipmann, Alberto Marchetti-Spaccamela, Leen Stougie</i>	258
Tighter Approximations for Maximum Induced Matchings in Regular Graphs <i>Zvi Gotthilf, Moshe Lewenstein</i>	270
On Approximating Restricted Cycle Covers <i>Bodo Manthey</i>	282
A PTAS for the Minimum Dominating Set Problem in Unit Disk Graphs <i>Tim Nieberg, Johann Hurink</i>	296
Speed Scaling of Tasks with Precedence Constraints <i>Kirk Pruhs, Rob van Stee, Patchrawat Uthaisombut</i>	307
Partial Multicuts in Trees <i>Asaf Levin, Danny Segev</i>	320
Approximation Schemes for Packing with Item Fragmentation <i>Hadas Shachnai, Tami Tamir, Omer Yehezkeley</i>	334
Author Index	349