

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

Alfred Kobsa

University of California, Irvine, CA, 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

TU Dortmund University, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Der-Tsai Lee Danny Z. Chen Shi Ying (Eds.)

Frontiers in Algorithmics

4th International Workshop, FAW 2010
Wuhan, China, August 11-13, 2010
Proceedings



Springer

Volume Editors

Der-Tsai Lee

Academia Sinica, Institute of Information Science 20, Section 2

128 Academia Road, Nankang, Taipei 11529, Taiwan

E-mail: dtlee@ieee.org

Danny Z. Chen

University of Notre Dame, Department of Computer Science and Engineering

Notre Dame, IN 46556, USA

E-mail: dchen@cse.nd.edu

Shi Ying

Wuhan University, State Key Laboratory of Software Engineering

Wuhan, Hubei 430072, China

E-mail: yingshi@whu.edu.cn

Library of Congress Control Number: 2010930688

CR Subject Classification (1998): F.2, D.2, F.1, G.2, F.3, G.2.2

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

ISSN 0302-9743

ISBN-10 3-642-14552-3 Springer Berlin Heidelberg New York

ISBN-13 978-3-642-14552-0 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.com

© Springer-Verlag Berlin Heidelberg 2010

Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper 06/3180

Preface

The papers in this volume were selected for presentation at the 4th International Frontiers of Algorithmics Workshop (FAW 2010), held during August 11-13, 2010 at Wuhan University, Wuhan, China. Previous meetings of this workshop were held in Lanzhou (2007), Changsha (2008), and Hefei (2009).

In response to the Call-for-Papers, 57 extended abstracts were submitted from 12 countries and regions, of which 28 were accepted. The submitted papers were from China, France, Hong Kong, India, Israel, Italy, Japan, Republic of Korea, Lebanon, The Netherlands, Taiwan, and USA.

The papers were evaluated by an international Program Committee. Each paper was evaluated by at least three Program Committee members, with possible assistance of the external referees, as indicated by the referee list found in these proceedings. In addition to the selected papers, the workshop also included three invited presentations by Mikhail J. Atallah, Deyi Li, and Kurt Mehlhorn, and two training sessions by John Hopcroft and Xiaotie Deng for providing students and young researchers with advanced research experience.

We thank all Program Committee members and the external referees for their excellent work, especially given the demanding time constraints. Furthermore, we thank the General Conference Co-chairs John Hopcroft and Deyi Li, and the Steering Committee Co-chairs Xiaotie Deng and Franco Preparata. It has been a wonderful experience to work with all of them. We also thank the three invited speakers, the two training session speakers, and all authors who submitted papers for consideration. They all contributed to the high quality of the workshop.

Finally, we thank all local organizers, led by Rong Peng, and the colleagues of the State Key Lab of Software Engineering and the School of Computer, Wuhan University, who worked tirelessly to put in place the logistical arrangements of the workshop and to create and maintain the website of the workshop. It was their hard work that made the workshop possible and enjoyable.

May 2010

Der-Tsai Lee
Danny Z. Chen
Shi Ying

Conference Organization

General Conference Co-chairs

John E. Hopcroft
Deyi Li

Steering Committee Co-chairs

Xiaotie Deng
Franco P. Preparata

Program Chairs

Der-Tsai Lee (Chair)
Danny Z. Chen (Co-chair)
Shi Ying (Co-chair)

Program Committee

Nancy Amato
Tetsuo Asano
Franz Aurenhammer
Gill Barequet
Amitabh Chaudhary
Ning Chen
Siu-Wing Cheng
Francis Chin
Kyung-Yong Chwa
Ovidiu Daescu
Peter Eades
Qizhi FANG
Rudolf Fleischer
Subir Ghosh
Sun-Yuan Hsieh
Ming-Yang Kao
Naoki Katoh
Lian Li
Angsheng Li
Xuemin Lin
Zhiyong Liu
Chi-Jen Lu

Pinyan Lu
Shuang Luan
Martin Noellenburg
Peter Rossmanith
Michiel Smid
Takeshi Tokuyama
Lusheng Wang
Haitao Wang
Feng Wang
Sue Whitesides
Xiaodong Wu
Jinhui Xu
Jinyun Xue
Jianping Yin
Guochuan Zhang
Louxin Zhang
Jian Zhang
Xiao Zhou
Hong Zhu
Binhai Zhu

Local Organization

Rong Peng (Chair)
Feng Wang
Ying Zheng
Mao Ye

External Reviewers

Muhammad Cheema
Yam K. Cheung
Hu Ding
Leah Epstein
Jywe-Fei Fang
Andreas Gernsma
Heng Guo
Xin Han
Xia Hua
Takehiro Ito
Justie Su-tzu Juan
Mong-Jen Kao
Bastian Katz
Joachim Kneis
Lap Kei Lee
Cheng-Chung Li
Fei Li
Jian Li
Qun Liu
Yunlong Liu
Wei Mi
Sang-il Oum

Yicheng Pan
Sheng-Lung Peng
Branislav Stojkovic
Kei Uchizawa
Dorothea Wagner
Kejun Wang
Ting Wang
Bang Ye Wu
Chenggang Wu
Yongan Wu
Zhilin Wu
Mingji Xia
Wei Xiong
Lei Xu
Deshi Ye
Hung-I Yu
Teng-Kai Yu
Honghai Zhang
Wenjie Zhang
Yongding Zhu
Marko Zivanic

Table of Contents

Progress on Certifying Algorithms (Invited Talk).....	1
<i>Kurt Mehlhorn and Pascal Schweitzer</i>	
Computational Geometry for Uncertain Data (Abstract of Invited Talk).....	6
<i>Mikhail J. Atallah</i>	
On Foundations of Services Interoperation in Cloud Computing (Invited Talk)	7
<i>Deyi Li, Haisu Zhang, Yuchao Liu, and Guishen Chen</i>	
Mechanism Design for Multi-slot Ads Auction in Sponsored Search Markets	11
<i>Xiaotie Deng, Yang Sun, Ming Yin, and Yunhong Zhou</i>	
Truthful Auction for CPU Time Slots	23
<i>Qiang Zhang and Minming Li</i>	
Top- d Rank Aggregation in Web Meta-search Engine (Extended Abstract)	35
<i>Qizhi Fang, Han Xiao, and Shanfeng Zhu</i>	
Minimum Common String Partition Revisited	45
<i>Haitao Jiang, Binhai Zhu, Daming Zhu, and Hong Zhu</i>	
Inapproximability of Maximal Strip Recovery: II	53
<i>Minghui Jiang</i>	
Minimizing Total Variation for Field Splitting with Feathering in Intensity-Modulated Radiation Therapy	65
<i>Yunlong Liu and Xiaodong Wu</i>	
Approximation Schemes for Scheduling with Availability Constraints ...	77
<i>Bin Fu, Yumei Huo, and Hairong Zhao</i>	
An $\Omega(\frac{1}{\epsilon} \log \frac{1}{\epsilon})$ Space Lower Bound for Finding ϵ -Approximate Quantiles in a Data Stream	89
<i>Regant Y.S. Hung and Hingfung F. Ting</i>	
Improved Sublinear Time Algorithm for Width-Bounded Separators	101
<i>Liang Ding, Bin Fu, and Yunhui Fu</i>	
Constant Time Generation of Biconnected Rooted Plane Graphs	113
<i>Bingbing Zhuang and Hiroshi Nagamochi</i>	

Solving General Lattice Puzzles	124
<i>Gill Barequet and Shahar Tal</i>	
A Hybrid Graph Representation for Recursive Backtracking Algorithms	136
<i>Faisal N. Abu-Khzam, Michael A. Langston, Amer E. Mouawad, and Clinton P. Nolan</i>	
On Tractable Exponential Sums	148
<i>Jin-Yi Cai, Xi Chen, Richard Lipton, and Pinyan Lu</i>	
Recognizing d -Interval Graphs and d -Track Interval Graphs	160
<i>Minghui Jiang</i>	
Categorical Semantics of a Solution to Distributed Dining Philosophers Problem	172
<i>Zhen You, Jinyun Xue, and Shi Ying</i>	
Approximation Algorithms for the Capacitated Domination Problem . . .	185
<i>Mong-Jen Kao and Han-Lin Chen</i>	
A Polynomial Time Approximation Scheme for Embedding Hypergraph in a Weighted Cycle	197
<i>Chaoxia Yang and Guojun Li</i>	
FPTAS's for Some Cut Problems in Weighted Trees	210
<i>Mingyu Xiao, Takuro Fukunaga, and Hiroshi Nagamochi</i>	
Deterministic Online Call Control in Cellular Networks and Triangle-Free Cellular Networks	222
<i>Joseph Wun-Tat Chan, Francis Y.L. Chin, Xin Han, Ka-Cheong Lam, Hing-Fung Ting, and Yong Zhang</i>	
Online Algorithms for the Newsvendor Problem with and without Censored Demands	234
<i>Peter Sempolinski and Amitabh Chaudhary</i>	
$O((\log n)^2)$ Time Online Approximation Schemes for Bin Packing and Subset Sum Problems	250
<i>Liang Ding, Bin Fu, Yunhui Fu, Zaixin Lu, and Zhiyu Zhao</i>	
Path Separability of Graphs	262
<i>Emilie Diot and Cyril Gavoille</i>	
Minimum Cost Edge-Colorings of Trees Can Be Reduced to Matchings	274
<i>Takehiro Ito, Naoki Sakamoto, Xiao Zhou, and Takao Nishizeki</i>	
Computing Minimum Diameter Color-Spanning Sets	285
<i>Rudolf Fleischer and Xiaoming Xu</i>	

Approximation Algorithm for the Largest Area Convex Hull of Same Size Non-overlapping Axis-Aligned Squares	293
<i>Wenqi Ju and Jun Luo</i>	
Optimum Sweeps of Simple Polygons with Two Guards	304
<i>Xuehou Tan and Bo Jiang</i>	
Adaptive Algorithms for Planar Convex Hull Problems	316
<i>Hee-Kap Ahn and Yoshio Okamoto</i>	
New Algorithms for Barrier Coverage with Mobile Sensors	327
<i>Xuehou Tan and Gangshan Wu</i>	
Author Index	339