

Lecture Notes in Computer Science

Edited by G. Goos and J. Hartmanis

401

H. Djidjev (Ed.)

Optimal Algorithms

International Symposium
Varna, Bulgaria, May 29–June 2, 1989
Proceedings



Springer-Verlag

Berlin Heidelberg New York London Paris Tokyo Hong Kong

Editorial Board

D. Barstow W. Brauer P. Brinch Hansen D. Gries D. Luckham
C. Moler A. Pnueli G. Seegmüller J. Stoer N. Wirth

Editor

Hristo Djidjev
Center of Informatics and Computer Technology
Bulgarian Academy of Sciences
Acad. G. Bonchev str., bl. 25-A, Sofia 1113, Bulgaria

CR Subject Classification (1987): F.1.2–3, F.2.2, G.2.2, E.1

ISBN 3-540-51859-2 Springer-Verlag Berlin Heidelberg New York

ISBN 0-387-51859-2 Springer-Verlag New York Berlin Heidelberg

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 other ways, and storage in data banks. Duplication of this publication or parts thereof is only permitted under the provisions of the German Copyright Law of September 9, 1965, in its version of June 24, 1985, and a copyright fee must always be paid. Violations fall under the prosecution act of the German Copyright Law.

© Springer-Verlag Berlin Heidelberg 1989
Printed in Germany

Printing and binding: Druckhaus Beltz, Hemsbach/Bergstr.
2145/3140-543210 – Printed on acid-free paper

FOREWORD

The papers included in this volume are a subset of the papers presented at the Second International Symposium on Optimal Algorithms held in Varna, Bulgaria, May 29-June 2, 1989. The symposium was organized and funded by the Center of Informatics and Computer Technology of the Bulgarian Academy of Sciences. There were two major sections: Algorithms and Optimal Recovery. This volume includes only papers presented in the section Algorithms.

Several people were invited to give special lectures at this symposium and all of them were invited to contribute papers for the proceedings. These papers are identified as invited papers in the table of contents. For the remaining papers, 51 were submitted for consideration, and of these, 37 were selected for formal presentation at the symposium. From these 37 contributed papers, after their presentation at the symposium, 13 were selected for inclusion in these proceedings. The papers in this volume have not been fully refereed, and those which contain original research results should be expected to appear later in a more complete form in regular refereed journals.

I would like to thank to the following members of the advisory committee for their help in making the final selection: F. Dehne, I. Ipsen, V. Ramachandran, J.-R. Sack, P. Spirakis, P. Young, as well to J. Reif for his cooperation. Finally I would like to thank to the members of the local organization committee, especially to V. Tzelkova, B. Stoyanova, and L. Aleksandrov for their efforts during the organization of the symposium and the preparation of these proceedings.

Sofia, June 1989

Hristo N. Djidjev

TABLE OF CONTENTS

Randomization in Parallel Algorithms and its Impact
on Computational Geometry (Invited)
J. H. Reif and S. Sen.....1

There Are Planar Graphs Almost as Good as the Complete Graphs
and as Short as Minimum Spanning Trees (Invited)
C. Levcopoulos and A. Lingas.....9

Computing Digitized Voronoi Diagrams on a Systolic Screen
and Applications to Clustering (Invited)
F. Dehne.....14

PRAM Algorithms for Identifying Polygon Similarity
C. S. Iliopoulos and W. F. Smyth.....25

A Framework for Parallel Graph Algorithm Design (Invited)
V. Ramachandran33

Fast Soliton Automata (Invited)
T. S. Papatheodorou and N. Tsantanis.....41

An Upper Bound on the Order of Locally Testable
Deterministic Finite Automata
S. Kim, R. McNaughton, and R. McCloskey.....48

A Fast Algorithm to Decide on Simple Grammars Equivalence
D. Caucal.....66

Complexity of the Parallel Givens Factorization on
Shared Memory Architectures (Invited)
M. Cosnard, E. M. Daoudi, and Y. Robert.....86

Optimal Bounds on the Dictionary Problem
A. Andersson.....106

Optimal Constant Space Move-to-Rear List Organization	
<i>B. J. Oommen and D. T. H. Ng</i>	115
Improved Bounds on the Size of Separators of Toroidal Graphs	
<i>L. G. Aleksandrov and H. N. Djidjev</i>	126
On Some Properties of (a,b)-Trees	
<i>R. Sprugnoli, E. Barucci, A. Chiuderi, and R. Pinzani</i>	139
Disassembling Two-Dimensional Composite Parts via Translations (Invited)	
<i>D. Nussbaum and J.-R. Sack</i>	153
Which Triangulations Approximate the Complete Graph?	
<i>G. Das and D. Joseph</i>	168
The Approximability of Problems Complete for P (Invited)	
<i>M. Serna and P. G. Spirakis</i>	193
A Structural Overview of NP Optimization Problems (Invited)	
<i>D. Bruschi, D. Joseph, and P. Young</i>	205
Sorting within Distance Bound on a Mesh-Connected Processor Array	
<i>B. Chlebus</i>	232
Local Insertion Sort Revisited	
<i>J. Katajainen, C. Levcopoulos, and O. Petersson</i>	239
Packet Routing on Grids of Processors	
<i>M. Kunde</i>	254
Optimal Parallel Computations for Halin Graphs	
<i>K. Diks and W. Rytter</i>	266
Optimal Parallel Algorithms for b-Matchings in Trees	
<i>C. N. K. Osiakwan and S. G. Akl</i>	274