

13th Workshop on Algorithmic Approaches for Transportation Modelling, Optimization, and Systems

Daniele Frigioni, Sebastian Stiller

► **To cite this version:**

Daniele Frigioni, Sebastian Stiller. 13th Workshop on Algorithmic Approaches for Transportation Modelling, Optimization, and Systems. Daniele Frigioni and Sebastian Stiller. ATMOS - 13th Workshop on Algorithmic Approaches for Transportation Modelling, Optimization, and Systems - 2013, Sep 2013, Sophia Antipolis, France. <hal-00872213>

HAL Id: hal-00872213

<https://hal.inria.fr/hal-00872213>

Submitted on 11 Oct 2013

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

13th Workshop on Algorithmic Approaches for Transportation Modelling, Optimization, and Systems

ATMOS'13, September 5, 2013, Sophia Antipolis, France

Edited by

Daniele Frigioni
Sebastian Stiller



Editors

Daniele Frigioni	Sebastian Stiller
University of L'Aquila	Technische Universität Berlin
L'Aquila, Italy	Berlin, Germany
daniele.frigioni@univaq.it	sebastian.stiller@tu-berlin.de

ACM Classification 1998

F.2 Analysis of Algorithms and Problem Complexity, G.1.6 Optimization, G.2.2 Graph Theory, G.2.3 Applications

ISBN 978-3-939897-58-3

Published online and open access by

Schloss Dagstuhl –Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <http://www.dagstuhl.de/dagpub/978-3-939897-58-3>.

Publication date

September, 2013

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <http://dnb.d-nb.de>.

License

This work is licensed under a Creative Commons Attribution 3.0 Unported license (CC-BY 3.0): <http://creativecommons.org/licenses/by/3.0/legalcode>.



In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

- Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/OASICS.ATMOS.2013.i

ISBN 978-3-939897-58-3

ISSN 2190-6807

<http://www.dagstuhl.de/oasics>

OASlcs – OpenAccess Series in Informatics

OASlcs aims at a suitable publication venue to publish peer-reviewed collections of papers emerging from a scientific event. OASlcs volumes are published according to the principle of Open Access, i.e., they are available online and free of charge.

Editorial Board

- Daniel Cremers (TU München, Germany)
- Barbara Hammer (Universität Bielefeld, Germany)
- Marc Langheinrich (Università della Svizzera Italiana – Lugano, Switzerland)
- Dorothea Wagner (*Editor-in-Chief*, Karlsruher Institut für Technologie, Germany)

ISSN 2190-6807

www.dagstuhl.de/oasics

■ Contents

Preface	
<i>Daniele Frigioni and Sebastian Stiller</i>	vii
Recoverable Robust Timetable Information	
<i>Marc Goerigk, Sascha Heße, Matthias Müller-Hannemann, Marie Schmidt, and Anita Schöbel</i>	1
Is Timetabling Routing Always Reliable for Public Transport?	
<i>Donatella Firmani, Giuseppe F. Italiano, Luigi Laura, and Federico Santaroni</i> ...	15
Robust Routing in Urban Public Transportation: How to Find Reliable Journeys Based on Past Observations	
<i>Katerina Böhmová, Matus Mihalák, Tobias Pröger, Rastislav Šrámek, and Peter Widmayer</i>	27
Delay-Robustness of Transfer Patterns in Public Transportation Route Planning	
<i>Hannah Bast, Jonas Sternisko, and Sabine Storandt</i>	42
Solving a Freight Railcar Flow Problem Arising in Russia	
<i>Ruslan Sadykov, Alexander Lazarev, Vitaliy Shyryaev, and Alexey Stratonnikov</i> ..	55
A Configuration Model for the Line Planning Problem	
<i>Ralf Borndörfer, Heide Hoppmann, and Marika Karbstein</i>	68
The Stop Location Problem with Realistic Traveling Time	
<i>Emilio Carrizosa, Jonas Harbering, and Anita Schöbel</i>	80
Evolution and Evaluation of the Penalty Method for Alternative Routes	
<i>Moritz Kobitzsch, Dennis Schieferdecker, and Marcel Radermacher</i>	94
Improved Alternative Route Planning	
<i>Andreas Paraskevopoulos and Christos Zaroliagis</i>	108
Result Diversity for Multi-Modal Route Planning	
<i>Hannah Bast, Mirko Brodesser, and Sabine Storandt</i>	123
Column Generation for Bi-Objective Vehicle Routing Problems with a Min-Max Objective	
<i>Boadu Mensah Sarpong, Christian Artigues, and Nicolas Jozefowicz</i>	137
Carpooling : the 2 Synchronization Points Shortest Paths Problem	
<i>Arthur Bit-Monnot, Christian Artigues, Marie-José Huguet, and Marc-Olivier Killijian</i>	150



■ Preface

Transportation networks give rise to very complex and large-scale network optimization problems requiring innovative solution techniques and ideas from mathematical optimization, theoretical computer science, and operations research. Since 2000, the series of *Algorithmic Approaches for Transportation Modelling, Optimization, and Systems* (ATMOS) workshops brings together researchers and practitioners who are interested in all aspects of algorithmic methods and models for transportation optimization and provides a forum for the exchange and dissemination of new ideas and techniques. The scope of ATMOS comprises all modes of transportation.

The 13th ATMOS workshop (ATMOS'13) was held in connection with ALGO'13, by INRIA and Campus SophiaTech, in Sophia Antipolis, France, on September 5, 2013. Topics of interest for ATMOS'13 were all optimization problems for passenger and freight transport, including, but not limited to, Demand Forecasting, Models for User Behavior, Design of Pricing Systems, Infrastructure Planning, Multi-modal Transport Optimization, Mobile Applications for Transport, Congestion Modeling and Reduction, Line Planning, Timetable Generation, Routing and Platform Assignment, Vehicle Scheduling, Route Planning, Crew and Duty Scheduling, Rostering, Delay Management, Routing in Road Networks, Traffic Guidance. Of particular interest were papers applying and advancing the following techniques: graph and network algorithms, combinatorial optimization, mathematical programming, approximation algorithms, methods for the integration of planning stages, stochastic and robust optimization, online and real-time algorithms, algorithmic game theory, heuristics for real-world instances, simulation tools.

In response to the call for papers we received 26 submissions, all of which were reviewed by at least three referees. The submissions were judged on originality, technical quality, and relevance to the topics of the workshop. Based on the reviews, the program committee selected the 12 papers which appear in this volume. Together, they quite impressively demonstrate the range of applicability of algorithmic optimization to transportation problems in a wide sense. In addition, Tobias Harks kindly agreed to complement the program with an invited talk entitled *Modeling and Optimizing Traffic Networks*.

We would like to thank the members of the Steering Committee of ATMOS for giving us the opportunity to serve as Program Chairs of ATMOS'13, all the authors who submitted papers, Tobias Harks for accepting our invitation to present an invited talk, the members of the Program Committee and all the additional reviewers for their valuable work in selecting the papers appearing in this volume, and the local organizers for hosting the workshop as part of ALGO'13. We also acknowledge the use of the EasyChair system for the great help in managing the submission and review processes, and Schloss Dagstuhl for publishing the proceedings of ATMOS'13 in its OASiCS series.

Finally, we are pleased to announce that this year, for the first time, ATMOS PC awards a Best Paper Award. The Best Paper of ATMOS 2013 is *A Configuration Model for the Line Planning Problem* by Ralf Borndörfer, Heide Hoppmann, and Marika Karbstein.

September, 2013

Daniele Frigioni

Sebastian Stiller



■ Organization

Program Committee

Ralf Borndörfer	Zuse-Institut and FU Berlin, Germany
Daniel Delling	Microsoft Research Silicon Valley, USA
Daniele Frigioni (co-chair)	University of L'Aquila, Italy
Laura Galli	University of Pisa, Italy
Spyros Kontogiannis	University of Ioannina, Greece
Christian Liebchen	Deutsche Bahn, Germany
Gabor Maroti	VU Amsterdam and Netherlands Railways, The Netherlands
Frédéric Meunier	Ecole des Ponts ParisTech, France
Dario Pacciarelli	Roma Tre University, Italy
Marc Pfetsch	TU Darmstadt, Germany
Robert Shorten	IBM Research and The Hamilton Institute, Ireland
Sebastian Stiller (co-chair)	TU Berlin, Germany

Steering Committee

Alberto Marchetti-Spaccamela	Sapienza University of Rome, Italy
Rolf Möhring	TU Berlin, Germany
Dorothea Wagner	Karlsruhe Institute of Technology, Germany
Christos Zaroliagis	University of Patras, Greece

List of Additional Reviewers

Gianlorenzo D'Angelo, Andrea D'Ariano, Mattia D'Emidio, Julian Dibbelt, Pavlos Efrimidis, Dimitris Fotakis, Loukas Georgiadis, Jan Marecek, Martin Mevissen, Alfredo Navarra, Alexander Richter, Arieh Schlote, Karsten Weihe, Jia Wuan Yu, Christos Zaroliagis.

Local Organizing Committee

Frédéric Cazals, Agnès Cortell (event manager), David Coudert, Olivier Devillers, Joanna Moulhierac, Monique Teillaud (chair).



■ List of Authors

Christian Artigues
Hannah Bast
Arthur Bit-Monnot
Katerina Böhmová
Ralf Borndörfer
Mirko Brodesser
Emilio Carrizosa
Donatella Firmani
Daniele Frigioni
Marc Goerigk
Jonas Harbering
Sascha Heße
Heide Hoppmann
Marie-José Huguet
Giuseppe F. Italiano
Nicolas Jozefowicz
Marika Karbstein
Marc-Olivier Killijian
Moritz Kobitzsch
Luigi Laura
Alexander Lazarev
Matus Mihalák
Matthias Müller-Hannemann
Andreas Paraskevopoulos
Tobias Pröger
Marcel Radermacher
Ruslan Sadykov
Federico Santaroni
Boadu Mensah Sarpong
Dennis Schieferdecker
Marie Schmidt

Anita Schöbel
Vitaliy Shiryaev
Rastislav Šrámek
Jonas Sternisko
Sebastian Stiller
Sabine Storandt
Alexey Stratonnikov
Peter Widmayer
Christos Zaroliagis



