

# Contents

## Technical Papers

Sharpening Constraint Programming Approaches for Bit-Vector Theory. . . . .	3
<i>Zakaria Chihani, Bruno Marre, François Bobot, and Sébastien Bardin</i>	
Range-Consistent Forbidden Regions of Allen’s Relations . . . . .	21
<i>Nicolas Beldiceanu, Mats Carlsson, Alban Derrien, Charles Prud’homme, Andreas Schutt, and Peter J. Stuckey</i>	
MDDs are Efficient Modeling Tools: An Application to Some Statistical Constraints. . . . .	30
<i>Guillaume Perez and Jean-Charles Régin</i>	
On Finding the Optimal BDD Relaxation. . . . .	41
<i>David Bergman and Andre Augusto Cire</i>	
Design and Implementation of Bounded-Length Sequence Variables . . . . .	51
<i>Joseph D. Scott, Pierre Flener, Justin Pearson, and Christian Schulte</i>	
In Search of Balance: The Challenge of Generating Balanced Latin Rectangles . . . . .	68
<i>Mateo Díaz, Ronan Le Bras, and Carla Gomes</i>	
Debugging Unsatisfiable Constraint Models . . . . .	77
<i>Kevin Leo and Guido Tack</i>	
Learning Decision Trees with Flexible Constraints and Objectives Using Integer Optimization. . . . .	94
<i>Sicco Verwer and Yingqian Zhang</i>	
Relaxation Methods for Constrained Matrix Factorization Problems: Solving the Phase Mapping Problem in Materials Discovery. . . . .	104
<i>Junwen Bai, Johan Bjorck, Yexiang Xue, Santosh K. Suram, John Gregoire, and Carla Gomes</i>	
Minimizing Landscape Resistance for Habitat Conservation . . . . .	113
<i>Diego de Uña, Graeme Gange, Peter Schachte, and Peter J. Stuckey</i>	
A Hybrid Approach for Stator Winding Design Optimization . . . . .	131
<i>Alessandro Zanarini and Jan Poland</i>	

A Distributed Optimization Method for the Geographically Distributed Data Centres Problem . . . . .	147
<i>Mohamed Wahbi, Diarmuid Grimes, Deepak Mehta, Kenneth N. Brown, and Barry O'Sullivan</i>	
Explanation-Based Weighted Degree . . . . .	167
<i>Emmanuel Hebrard and Mohamed Siala</i>	
Counting Weighted Spanning Trees to Solve Constrained Minimum Spanning Tree Problems . . . . .	176
<i>Antoine Delaite and Gilles Pesant</i>	
The Weighted Arborescence Constraint . . . . .	185
<i>Vinasetan Ratheil Houndji, Pierre Schaus, Mahouton Norbert Hounkonnou, and Laurence Wolsey</i>	
Learning When to Use a Decomposition . . . . .	202
<i>Markus Kruber, Marco E. Lübbecke, and Axel Parmentier</i>	
Experiments with Conflict Analysis in Mixed Integer Programming . . . . .	211
<i>Jakob Witzig, Timo Berthold, and Stefan Heinz</i>	
A First Look at Picking Dual Variables for Maximizing Reduced Cost Fixing . . . . .	221
<i>Omid Sanei Bajgirani, Andre A. Cire, and Louis-Martin Rousseau</i>	
Experimental Validation of Volume-Based Comparison for Double-McCormick Relaxations. . . . .	229
<i>Emily Speakman, Han Yu, and Jon Lee</i>	
Minimum Makespan Vehicle Routing Problem with Compatibility Constraints . . . . .	244
<i>Miao Yu, Viswanath Nagarajan, and Siqian Shen</i>	
Solving the Traveling Salesman Problem with Time Windows Through Dynamically Generated Time-Expanded Networks . . . . .	254
<i>Natashia Boland, Mike Hewitt, Duc Minh Vu, and Martin Savelsbergh</i>	
A Fast Prize-Collecting Steiner Forest Algorithm for Functional Analyses in Biological Networks. . . . .	263
<i>Murodzhon Akhmedov, Alexander LeNail, Francesco Bertoni, Ivo Kwee, Ernest Fraenkel, and Roberto Montemanni</i>	
Scenario-Based Learning for Stochastic Combinatorial Optimisation . . . . .	277
<i>David Hemmi, Guido Tack, and Mark Wallace</i>	

Optimal Stock Sizing in a Cutting Stock Problem with Stochastic Demands . . . . .	293
<i>Alessandro Zanarini</i>	
Stochastic Task Networks: Trading Performance for Stability . . . . .	302
<i>Kiriakos Simon Mountakis, Tomas Klos, and Cees Witteveen</i>	
Rescheduling Railway Traffic on Real Time Situations Using Time-Interval Variables . . . . .	312
<i>Quentin Cappart and Pierre Schaus</i>	
Dynamic Temporal Decoupling. . . . .	328
<i>Kiriakos Simon Mountakis, Tomas Klos, and Cees Witteveen</i>	
A Multi-stage Simulated Annealing Algorithm for the Torpedo Scheduling Problem. . . . .	344
<i>Lucas Kletzander and Nysret Musliu</i>	
Combining CP and ILP in a Tree Decomposition of Bounded Height for the Sum Colouring Problem . . . . .	359
<i>Maël Minot, Samba Ndojh Ndiaye, and Christine Solnon</i>	
htd – A Free, Open-Source Framework for (Customized) Tree Decompositions and Beyond . . . . .	376
<i>Michael Abseher, Nysret Musliu, and Stefan Woltran</i>	
The Nemhauser-Trotter Reduction and Lifted Message Passing for the Weighted CSP . . . . .	387
<i>Hong Xu, T.K. Satish Kumar, and Sven Koenig</i>	
A Local Search Approach for Incomplete Soft Constraint Problems: Experimental Results on Meeting Scheduling Problems . . . . .	403
<i>Mirco Gelain, Maria Silvia Pini, Francesca Rossi, Kristen Brent Venable, and Toby Walsh</i>	
<b>Author Index . . . . .</b>	<b>419</b>

Integration of AI and OR Techniques in Constraint  
Programming

14th International Conference, CPAIOR 2017, Padua,  
Italy, June 5-8, 2017, Proceedings

Salvagnin, D.; Lombardi, M. (Eds.)

2017, XXIII, 420 p. 78 illus., Softcover

ISBN: 978-3-319-59775-1