

Special issue of the *Journal of Heuristics* on “Heuristic Research: Advances and Applications”

Roger Z. Ríos-Mercado

Published online: 20 June 2008
© Springer Science+Business Media, LLC 2008

Preface

This issue contains a selection of papers presented at CLAIO XIII, the 13th Latin–Iberian–American Conference on Operations Research and Systems, held in Montevideo, Uruguay, on November 27–30, 2006.

CLAIO XIII was organized by the University of the Republic of Uruguay (UdelaR) and the Latin–Iberian–American Association of Operations Research Societies (ALIO). The event was sponsored by IFORS (International Federation of Operational Research Societies), the Uruguayan National Program for the Development of Basic Sciences (PEDECIBA), the Council of Scientific Research (CSIC-UdelaR), and the Council of Education (CSE-UdelaR).

The CLAIO conferences, held biannually since 1982, highlight recent developments in theory, models, algorithms, and applications of operations research in its broadest sense. In particular, this issue is devoted to those works that represent successful applications of research on heuristic methods. These include contributions that address complex problems driven by real-world applications and works that present significant advances to the state-of-the-art on difficult optimization problems.

Among the more than 300 papers presented at the conference, 17 were submitted to this special issue. Each submission was peer-reviewed under the journal’s criteria for scientific merit. The selected articles cover application areas such as optimal design of motorcycle frames, assembly line balancing, and hospital waste manage-

R.Z. Ríos-Mercado (✉)
Systems Engineering Grad. Program, UANL, AP 111-F, Cd. Universitaria, San Nicolas de los Garza,
NL 66450, Mexico
e-mail: roger@mail.uanl.mx
url: <http://yalma.fime.uanl.mx/~roger/>

R.Z. Ríos-Mercado
e-mail: roger@yalma.fime.uanl.mx

ment, as well as heuristic approaches such as GRASP, multi-objective evolutionary algorithms, and hybrid metaheuristics.

In “An Evaluation of Constructive Heuristic Methods for Solving the Alternative Subgraphs Assembly Line Balancing Problem”, Liliana Capacho, Rafael Pastor, Alexander Dolgui, and Olga Gunshinskaya evaluate a set of constructive heuristic methods for the Alternative Subgraphs Assembly Line Balancing Problem, which considers variants for different parts of a production or manufacturing process. Each variant is represented by a precedence subgraph that defines the tasks to be performed and their processing times. The proposed methods use priority rules and random choice to select the assembly subgraphs and to assign the tasks to the stations in order to minimize the number of required workstations.

In “GRASP with Hybrid Heuristic-Subproblem Optimization for the Multi-Level Capacitated Minimum Spanning Tree Problem”, Alexandre Martins, Mauricio de Souza, Marcone Souza, and Túlio Toffolo present a GRASP-based approach for the Multi-Level Capacitated Minimum Spanning Tree (MLCMST) problem. Their approach uses an hybrid heuristic-subproblem method that attempts to exploit the solution of smaller-sized MLCMST instances. Their empirical work shows the proposed approach improves the best known upper bounds for almost all of the considered instances taken from benchmarks from literature.

In “Hybrid Biobjective Evolutionary Algorithms for the Design of a Hospital Waste Management Network”, Andrés Medaglia, Juan Villegas, and Diana Rodríguez-Coca present a hybrid approach that combines a multiobjective evolutionary algorithm (NSGA II) with a mixed-integer program for a biobjective obnoxious facility location problem that deals with the existing tradeoff between a low-cost operating network and the negative effect on the population living near the waste management facilities. This problem is motivated by a real-world application in Bocayá, Colombia.

In “Design of a motorcycle frame using neuroacceleration strategies in MOEAs”, Jorge Rodríguez, Andrés Medaglia, and Carlos Coello Coello present a neuroacceleration strategy for multiobjective evolutionary algorithms (MOEAs) based on the combined use of real and approximate fitness function evaluations. The proposed approach accelerates convergence to the Pareto optimal front comprised of nondominated frame designs. The proposed MOEA uses a mixed genotype to encode discrete and continuous design variables, and a set of genetic operators applied according to the type of variable. Their approach is successfully applied to motorcycle frame design.

I would like to acknowledge the authors for delivering the high-quality work that have made this issue possible. I am deeply grateful to the referees, for their hard and rigorous work. Their constructive comments and criticism contributed significantly to the quality of the issue. Special thanks to Melissa Andersen and Renz Beniquett, from the journal editorial office, for their kind and highly professional assistance on preparing this issue. I also would like to express my highest appreciation to Manuel Laguna, the *Journal of Heuristics* Editor-in-Chief, for his valuable support to this and earlier CLAIOs by making the journal available for these special issues. Finally, my most sincere gratitude goes to Marita Urquhart (CLAIO XIII Organizing Committee Chair) and Héctor Cancela (CLAIO XIII Program Committee Chair) for allowing me undertake this project.

Appreciation to referees

- Daniel Aloise (École Polytechnique de Montréal, Canada)
Masri Ayob (Universiti Kebangsaan Malaysia, Malaysia)
José Carlos Becceneri (Brazilian Space Research Institute, Brazil)
Burçin Bozkaya (Sabancı University, Turkey)
Jose Elias Claudio Arroyo (Universidade Federal de Viçosa, Brazil)
Carlos Coello (CINVESTAV-IPN, México)
T.G. Crainic (University of Montreal, Canada)
Karim de Alba (Universidad Autonoma Agraria Antonio Narro, Mexico)
Paola Festa (University of Naples Federico II, Italy)
Andreas Fink (Helmut-Schmidt-University, Germany)
Fred Glover (University of Colorado, USA)
Massimiliano Gobbi (Politecnico di Milano, Italy)
José Luis González-Velarde (ITESM, Mexico)
Jens Gottlieb (SAP AG, Germany)
M. Khouja (University of North Carolina, USA)
A.J.D. Lambert (Technische Universiteit Eindhoven, Netherlands)
Rafael Martí (Universitat de Valencia, Spain)
Pedro Coimbra Martins (Polytechnic Institute of Coimbra, Portugal)
Jorge J.M. Mendes (Instituto Superior de Engenharia do Porto, Portugal)
Julián Molina (University of Malaga, Spain)
Marcos Moreno (Universidad de La Laguna, Spain)
Hua Ni (USA)
Ulrich Pferschy (University of Graz, Austria)
Justo Puerto (Universidad de Sevilla, Spain)
G. Raidl (Vienna University of Technology, Austria)
Chandrasekharan Rajendran (Indian Institute of Technology Madras, India)
Helena Ramalhinho (Universitat Pompeu Fabra, Spain)
Celso C. Ribeiro (Catholic University of Rio de Janeiro, Brazil)
Franz Rothlauf (Universität Mannheim, Germany)
Rubén Ruiz (Polytechnic University of Valencia, Spain)
Armin Scholl (Friedrich-Schiller-University, Germany)
Yuhui Shi (Purdue University, USA)
Tian-Pian Shuai (USA)
Éric Taillard (University of Applied Sciences of Western Switzerland, Switzerland)
Fatih M. Tasgetiren (Fatih University, Turkey)
Manoj K. Tiwari (Indian Institute of Technology, India)
Sebastián Urrutia (Universidade Federal de Minas Gerais, Brazil)
Vicente Valls (Universitat de Valencia, Spain)
Pascal Van Hentenryck (Brown University, USA)