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Editorial: Intelligent optimization for manufacturing operations

Jairo R. Montoya-Torres

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This special issue is related to the XIV Latin-Ibero-American Conference on Operations Research (CLAIO-2008) held in Cartagena de Indias, Colombia, September 9–12, 2008. The meeting was hosted by the Colombian Society for Operations Research (SOCIO) and the Latino-Ibero American Association for Operations Research (ALIO) and was jointly organized by four Colombian universities: Universidad del Norte (Barranquilla), Politécnico Grancolombiano Institución Universitaria (Bogotá, D.C), Universidad Tecnológica de Bolívar (Cartagena de Indias) and Universidad EAFIT (Medellín). Held biannually, the CLAIO conference series highlights recent developments of theory, models, algorithms, and applications of Operations Research in the broadest sense. Previous versions were held in Rio de Janeiro, Brazil (1982, 1988, 1996), Buenos Aires, Argentina (1984, 1990, 1998), Santiago, Chile (1986, 1994), Mexico City (1992, 2000), Concepción, Chile (2002), La Habana, Cuba (2004) and Montevideo, Uruguay (2006).

In the CLAIO-2008 version, 11 plenary speakers were invited. A total of 732 papers were presented at the conference venue authored by 1919 researchers from 40 different countries. The number of attendees was about 750 academics, students and practitioners. A total of 8 workshops and 4 tutorials were organized by senior researchers from around the world. It is to highlight the presence of the Colombian Professor Guillermo Owen as Honorary Chair of CLAIO 2008. Professor Owens, currently working at the Naval Postgraduate School, Monterey, USA, is a world famous researcher in Game Theory. His participation in the conference venue shows the high academic level of CLAIO-2008. With the official authorization given by the Latin-Ibero-American Association for Operations Research, academic and organization committees of CLAIO 2008 included a Meeting on Game Theory, in honor of Prof. Guillermo Owen on the occasion of his 70th birthday.

Following previous special issues of highly recognized international academic journals, this special issue is focused on "Intelligent Optimization for Manufacturing Operations". Mainly devoted to the best papers of the CLAIO 2008 conference, the submission process was also open to authors presenting works related to the topic of this issue not necessary presented at the conference venue. After a first selection based on the quality of both the extended abstract and the presentation, 14 papers were received to participate on the evaluation process for this special issue. Only 5 papers were finally selected after the rigorous traditional peer-review process of the journal for scientific merit. These papers present applications of intelligent optimization techniques to solve realistic hard optimization problems found in services or in industry sectors, employing advanced OR techniques to solve them.

The paper of Damodaran, Vélez-Gallego and Maya proposes a Greedy Randomized Adaptive Search Procedure (GRASP) to solve the identical batch parallel machine scheduling problem. The objective is to minimize the total completion time of jobs (makespan) subject to non-zero job release times and arbitrary job sizes.

The paper of Garcia-Cascales and Lamata considers the decision problem of maintenance in an engine factory that is specialized in the production, sale and maintenance of medium and slow speed for stroke engines. The problem is solved using the Analytic Hierarchy Process (AHP) to obtain the weights of criteria, and the TOPSIS Method as multi-criteria decision-making tool to obtain the ranking of alternatives.

J. R. Montoya-Torres (✉)
Escuela Internacional de Ciencias Economicas y Administrativas, Universidad de La Sabana, Km 7 autopista norte de Bogotá, D.C., Chia, Cundinamarca, Colombia
e-mail: jairo.montoya@unisabana.edu.co; jrmontoy@yahoo.com

The paper of Dong, Tang, Lai and Kong addresses a vehicle routing and scheduling problem arising in flight ticket sales companies for the service of free pickup and delivery of airline passengers to the airport. They formulate the problem using the Vehicle Routing Problem with Time Windows (VRPTW) framework, with the objective of minimizing the total operational costs. An exact method based on a 0–1 mixed-integer linear programming model for the set-partitioning problem is presented. The model is tested using both random-generated and real-life data.

The paper of Oliveira, Hamacher and Almeida studies the scheduling problem in oil refineries. Their approach is based on the development of two solution approaches: mathematical modeling based on mixed-integer linear programming and genetic algorithms. Because of the complexity of the MILP model, GA are required to meet real-life decision-making conditions. Both approaches are validated and compared using real-life data-set from the production of fuel oil and asphalt in a large refinery.

Finally, the paper of Solano-Charris, Montoya-Torres and Paternina-Arboleda presents the application of Ant Colony Optimization (ACO) for a bi-objective flexible flow shop scheduling problem with two-stages. The objectives to be optimized were the makespan and the sum of completion time of jobs. Since no previous works about this multi-objective scheduling problem have yet been published, computational experiments using random-generated instances from the literature were run in order to compare the ACO algorithm against state-of-the-art mono-objective heuristics.

The completion of this special issue has involved hard work and contributions by several people in addition to the authors of the papers. I first acknowledge Professor Andrew Kusiak, Editor-in-Chief of the *Journal of Intelligent Manufacturing*, for fully supporting the idea of guest-editing this special issue, as well as Professor Carlos D. Paternina-Arboleda, Chair of the CLAIO-2008 Academic Committee. May I take this opportunity to thanks Carlos for the continuous collaboration and mutual support in teaching and research during the last 10 years. Miss Lauren Castro, Secretary of CLAIO-2008, has to be acknowledged as she was always behind the organization of the conference and provided key information to finish this editorial preface.

The number of submissions for this issue resulted in the calling on the services of many referees from many countries. I therefore thank these anonymous individuals for helping with the review process. They each spent many hours in reviewing, critiquing, and re-reviewing the papers considered for this issue. Without their efforts, this issue could not have been completed. Last but not least, I am thankful to Dr. Gustavo Ramírez Valderrama, Dean of the School of Economics and Management Sciences, for allowing me to work on this special issue.