Every day, enterprises and organizations around the world struggle with the complexity of problems related to vehicle routing, scheduling, system availability and supply chain management. Efficient approaches to confront these problems require combining knowledge from multiple disciplines such as Computer Science (CS), Operations Research (OR), Artificial Intelligence (AI), and Information Technologies & Systems (ITS). In any developed country, the aforementioned problems represent important challenges for strategic sectors such as industry and services, which explains the relevance of the proposed topics to current international research.

Hybridization of known procedures is a way to tackle new challenging and especially difficult problems. Hybridization is not merely a mixture or stack of methods in the hope of obtaining a miraculous result to solve difficult problems, but the suitable design of new algorithms with the selection of the most appropriate known procedures. Later, these procedures have to be accurately tuned to give the apposite solution to the problem. There are, and there already have, been many papers and books about hybridization in Algorithmics; we want, with this special issue, to make our small contribution to broadening the scope of the study of hybrid algorithms in real world.

This special issue is composed of four research papers and one book-review paper. All of these refer to different topics in current developments and practical applications of Hybrid Algorithms in the Routing, Scheduling and Availability knowledge areas. The issue originated from presentations at the 2010 International IN3-HAROSA Workshop, which was held in Barcelona, Spain, during November 9–11, 2009. Selected contributions were extended and went through a blind peer review process.
In this special issue, several topics on the hybridization of algorithms to solve practical routing, scheduling and availability problems are covered. The first paper, “Discrete-event Simulation Models for Assessing Incidents in Railway Systems” by García- Sánchez and Ortega-Mier, develops a Simulation Model for Railway Systems, including both train movements and passengers’ behavior. Then, a case study is presented in which different corrective policies are analyzed. The second article, “Minimizing Empty Truck Loads in Round Timber Transport with Tabu Search Strategies” by Hirsch, proposes some Tabu Search-based methods for solving the Timber Transport Vehicle Routing Problem. The efficiency of these methods is then analyzed by using real-life data. In the third contribution, “Solving a Bi-criteria Hybrid Flowshop Scheduling Problem Occurring in Apparel Manufacturing” by Montoya-Torres and Vargas-Nieto, the problem of production scheduling in a company is analyzed. The problem is modeled as a flexible flowshop in two stages and a bi-objective Genetic Algorithm is proposed and tested using real data. The fourth paper, “Solving Vehicle Routing Problems Using Constraint Programming and Lagrangean Relaxation in a Metaheuristics Framework” by Guimarans et al., offers a hybrid methodology combining the Variable Neighborhood Search metaheuristic with Constraint Programming and Lagrangean Relaxation to solve the Capacitated Vehicle Routing Problem. Finally, this special issue includes a book review by Guo and Monteforte. The reviewed book is “Simulation Methods for Reliability and Availability of Complex Systems” edited by Faulin et al., recently published by Springer.

All in all, as Guest Editors of this special issue, we would like to thank all the authors for their contributions and the referees for their outstanding cooperation and constructive comments.

Angel A. Juan
Javier Faulin
Scott Grasman
Daniel Riera
Guest Editors
IJISSCM

Angel A. Juan is an Associate Professor of Simulation and Data Analysis in the Computer Science Department at the Open University of Catalonia, Spain. He holds a Ph.D. in Industrial Engineering, an M.S. in Information Technologies, and a M.S. in Applied Mathematics. His research interests include applications of Modeling & Simulation, Quantitative Data Analysis, and Computer Supported Mathematical e-Learning. He is an editorial board member of the Int. J. of Data Analysis Techniques and Strategies as well as of the Int. J. of Information Systems & Social Change, and a member of the INFORMS society.

Javier Faulin is an Associate Professor of Statistics and Operations Research at the Public University of Navarre (Pamplona, Spain). He holds a PhD in Economics, a MS in Operations Management, Logistics and Transportation and a MS in Applied Mathematics. His research interests include logistics, vehicle routing problems, environmental problems related to transportation and supply chain management and simulation modeling and analysis. He is a member of INFORMS and EURO societies and an editorial board member of the International Journal of Applied Management Science and the International Journal of Operational Research and Information Systems.
Scott E. Grasman is Associate Professor, as well as Associate Chair, of Engineering Management and Systems Engineering at Missouri University of Science and Technology. He has also served as Adjunct Professor of Operations and Manufacturing Management in the Olin Business School at Washington University in St. Louis, and was a Visiting Professor of Statistics and Operations Research at the Public University of Navarre in Spain. He holds B.S.E., M.S.E., and Ph.D. degrees in Industrial and Operations Engineering. His recent research includes alternative fuels programs, public-private-partnerships for environmentally sustainable transportation, alternative energy infrastructure modeling/simulation, and sustainability in supply chain and facility logistics. His web page is http://web.mst.edu/~grasmans/.

Daniel Riera is PhD Engineer in Computer Science by the Universitat Autònoma de Barcelona (UAB) since 2006. Master in Advanced Techniques of Processes Automatisation since 2001 (UAB) and Computer Science Engineer (UAB) since year 1998. Granted by the Ministry with a scholarship in Formation of Research Staff (FPI), spends a year in the Imperial College of London, as academic visitor, working in the ICParc, department of planning and control of resources. There, he receives formation in Constraint Programming and Optimisation, and collaborates in projects for the RAC and Railtrack. He taught in the UAB between September 1998 and August 2005. From September 2005, he works as lecturer in the Department of Computer Science, Multimedia and Telecommunication (EIMT) in UOC. From September 2006, he is academic director of Master in Bioinformatics offered in UOC. His teaching activities mainly concentrate in programming and bioinformatics. From January 2007 he is Director of Computer Science Engineering in the EIMT. His main research scopes include the model of discreet systems using Petri nets, the optimisation using Constraint Programming techniques. He is author of several papers in journals and international congresses. He has participated in projects as a member of the research staff and as a lead researcher. He has been researcher of the LOGISIM, centre of simulation and optimisation of logistic systems, from the Network of Centres of Support to Technological Innovation (XIT) of the CIDEM. Currently, he belongs to the research group in software engineering of UOC (GRES-UOC) where investigates the verification of UML+OCL models by means of Constraint Programming. Furthermore, he codirects the HAROSA knowledge community on the design of hybrid algorithms to solve combinatorial problems.