COMBINATORIAL OPTIMIZATION IN PRODUCTION AND LOGISTICS SYSTEMS

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The 13th congress of the French operations research society (ROADEF 2012) held at Angers (Loire-valley) in April 2012 brought together more than 270 high-quality contributions and 430 participants from both academia and industry. The purpose of this special issue is to gather the best contributions presented at the conference in the field of production and transport logistics

It is widely acknowledged that planning, scheduling and transport logistics play a vital role in the competitiveness of organizations by producing and delivering timely and accurately goods and services to customers. As such, it is not surprising that production and transport logistics always have a prominent place for companies, especially in the current economic context.

In the conventional way, transport logistics is dedicated to managing and optimizing the movement of goods, persons and information, by integrating the various aspects of the supply chain: from procurement, inventory management and storage to distribution and transportation. On the other hand, the classical purpose of planning and scheduling is to find the right organization for production to keep company costs down, increase efficiency and smoothly cooperate with the supply chain.

Beyond these traditional considerations, the economic uncertainty, the energy and environmental challenges profoundly reshapes the research landscape of transportation and production scheduling. First, the volatile and competitive economic context implies higher productivity faster responsiveness and more flexibility than ever. This ultimately has driven researchers to investigate more complex and larger problems and/or to take into account uncertainties. In the same vein, the increasing importance of sustainable development in decision-making has led to the

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emergence of new optimization problems, especially in the domains of energy and transport, and the focalization on new optimization criterion, like energy saving, or CO^2 emissions minimization

In this special issue we emphasize these new trends, focusing on various applications:

A multi-destination daily carpooling problem and an ant colony based resolution method

Yuhan Guo, Gilles Goncalves, Tienté Hsu

The rising car usage deriving from growth in jobs and residential population causes air pollution, energy waste and consumption of people's time. Public transport cannot be the only answer to this increasing transport demand. Carpooling has emerged to be a viable possibility for reducing private car usage in congested areas This paper describes an ant colony algorithm based hybrid approach (AHA) for solving the multi-destination carpooling problem.

Lagrangean heuristic for a multi-plant lot-sizing problem with transfer and storage capacities

Samuel Deleplanque, Safia Kedad-Sidhoum and Alain Quilliot

This paper addresses a multi-item, multi-plant lot-sizing problem with transfer costs and capacity constraints. The problem is reformulated according to a multi-commodity flow formalism, and de- composed, through Lagrangean relaxation, into a master facility location problem and a slave minimal cost multi-commodity flow problem.

Service network design in short and local fresh food supply chain

Maxime Ogier, Van-Dat Cung and Julien Boissière

This paper aims at developing efficient solving methods for an original service network design problem imbued with sustainable issues. The original features of the problem are the seasonality of supply, the limitation of transshipments for a product and no possibility of storage between consecutive periods. The authors propose for this problem a Mixed Integer Programming formulation and two solving techniques: Benders Decomposition and Dynamic Slope Scaling Procedure.

Robust real-time optimization for the linear oil blending

Stefan Janaqi, Jorge Aguilera and Meriam Chèbre

This paper presents a robust real-time optimization method for the online linear oil blending process. The blending process consists in determining the optimal mix of components so that the final product satisfies a set of specifications. The authors examine different sources of uncertainty inherent to the blending process and show how to address this uncertainty applying the Robust Optimization techniques. The polytopal structure of their problem permits a simplified robust approach.

A hybrid approach combining local search and constraint programming for a large scale energy management problem

Haris Gavranovic and Mirsad Buljubasic

This paper presents a heuristic approach combining constraint satisfaction, local search and a constructive optimization algorithm for a large-scale energy management and maintenance scheduling problem. The methodology shows how to successfully combine and orchestrate different types of algorithms and to produce competitive results. A large part of the presented work was done to compete in the ROADEF/EURO Challenge 2010, organized jointly by the ROADEF, EURO and Electricité de France.

In conclusion, we would like to thank a number of people who made this special issue possible. First of all, our thanks go to the Editor-in-Chief of RAIRO Operations Research, Professor Ridha Mahjoub, who encouraged our idea of hosting a special issue on the proposed topic. We would also like to thank Mme Marie-Thérèse Dron, Production Editor of EDP Sciences for her helpful assistance relating to the editorial management. Furthermore, we thank the authors of all submitted papers for considering this special issue as a valuable outlet for their works. Lastly, our sincere appreciation goes to the reviewers who accepted to refer the submitted papers. We thank them for the time they provided for performing these reviews, and for the valuable comments they submitted to help the authors for improving the overall quality of their work.