Editorial

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Biographical notes: Enrique Alba received his PhD in Computer Science in 1999 on parallel and distributed genetic algorithms. Since then, he has published 40 scientific papers in international indexed journals and more than 150 papers in international conferences, having several awards to his research quality. He is currently a Full Professor of Computer Science in the Department of Lenguajes y Ciencias de la Computación, University of Málaga, Spain. His research interests include the design and application of evolutionary algorithms and other metaheuristic procedures to real problems, including telecommunications, combinatorial optimisation, software engineering, and bioinformatics. The main focus of all his work is on parallelism.

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Solving real-world optimisation problems faces metaheuristic algorithms to really challenging tasks, such as high computational requirements, hardly constrained landscapes, high dimensionality, etc. These challenges have to be addressed properly in order to provide this kind of problems with high quality solutions (preferably in short times). Usually this means to extend or to create new operators, algorithms or implementations that are specifically targeted to be used in real-world contexts. These topics are the core of the articles in this special issue.

Sirdey, Carlier, and Nace present a concrete and successful application of such the GRASP metaheuristic to a real industrial problem called the process move problem (PMP). PMP has applications in the design of high availability real-time distributed switching systems in the telecommunication industry. Indeed, GRASP has been finally chosen and implemented in such a real system since it has shown to reach similar quality solutions much faster than simulated annealing and branch-and-bound on a wide spectrum of hard instances. The authors have also remarked the importance of the low implementation requirements of GRASP in comparison to exact approaches such as branch-and-bound or branch-and-cut, which is also of great importance in the industrial context.

Kharrat, Chabchoub, and Aouni use a simulated annealing with an adaptive memory (TCM-SA) for solving the optimisation problem that arises in the integration of decision-maker's preferences with in an interactive imprecise goal programming model. The approach is specially tailored for addressing large scale, real-world decision-making scenarios. Several test problems including one coming from the manufacturing industry are evaluated.

Van Volsem's contribution is devoted to allocating the inspection effort for product quality in multistage manufacturing systems by jointly considering all the inspection parameters together. The goal is to ensure a minimum output quality while minimising the total inspection cost. An evolutionary algorithm (EA) has been used to provide this problem with meaningful solutions. The fitness computation of these solutions requires embedding simulation into the EA procedure. This is a rather common approach when solving real-world optimisation problems.

Dhouib proposes a new metaheuristic based on simulated annealing for solving both combinatorial and continuous optimisation problems. The algorithm is a multi-agent, heterogeneous approach in which each agent cooperates via an adaptive central memory. Its suitability for solving real-world problems has been shown by addressing two engineering design problems for which the optimal solution has been reached.

A new parallel metaheuristic based on the ant colony optimisation algorithm is presented by Pedemonte and Cancela. It is targeted to solve real-world sized instances of an hard optimisation problem that arises when searching for dependable, fault-tolerant network topologies in the telecommunication industry. The results have shown that the new algorithm finds high quality-solutions with a parallel efficiency, thus reducing the computational times to affordable values.

Given the range of potential applications of metaheuristics methods to real-world optimisation problems, the five papers presented here are only a small sample of this vast research field. We hope that this special issue will encourage further work and promote advances in

the area of metaheuristics for solving real-world problems. This is one of our target domains of research, and we encourage readers to visit http://neo.lcc.uma.es for more details on such a work.

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