new trends in metaheuristics and their applications

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This special issue consists of five papers that present new trends on metaheuristics and their applications in industrial engineering and science.

In the first paper, Marinakis, Marinaki, Matsatsinis and Zopounidis propose a discrete artificial bee colony optimization to solve a financial classification problem involving credit risk assessment. The proposed method uses also local search based classifiers. The performance of the method is evaluated on several benchmark instances. The obtained results are compared to the performances of other well-known metaheuristics.

In the second paper, Kessentini, Bar-chiesi, Grosges, Giraud-Moreau and Lamy de la Chapelle describe a non-uniform adapted Particle Swarm Optimization (PSO) to solve a plasmonic problem. The method is tested and compared to several other metaheuristics such as the standard Particle Swarm Optimization (PSO), the meta-PSO (by Veenhuis, 2006) and the ANUHEM (by Barchiesi, 2009). All these approaches are applied to the specific problem of the optimization of Surface Plasmon Resonance Biosensors design. The obtained results show the effectiveness of the proposed approach.

An integrated ant colony optimization is reported in the third paper by Khalouli, Ghed-jati, and Hamzaoui to solve the multistage hybrid flow-shop scheduling problem, with the aim of minimizing the makespan (the date of completion of the last job). The proposed method considers jointly the assignment and the sequencing sub-problems. The method is evaluated by testing several benchmark instances from the literature. The numerical experiments show the performance of the proposed algorithm compared to other existing methods.

The contribution of the fourth paper consists in a Discrete Particle Swarm Optimization (DPSO) approach for the Multi-Level Lot-Sizing Problem (MLLP). In the above work, Deroussi and Lemoine consider an uncapacitated lot sizing problem dedicated to materials requirements planning (MRP) systems. The specificity of their DPSO approach is based on the cost modification and the use of the PSO in its original form, by using continuous velocity equations. The authors show that the proposed DPSO can reach the solution of the MLLP. The proposed DPSO method is tested on benchmark instances from the literature. The obtained results confirm the efficiency of the proposed method, in particular, compared to the unique DPSO already developed in the literature to solve the MLLP.

In the fifth paper Euchi, Chabchoub and Yassine propose an Iterated Density Estimation Evolutionary Algorithm (IDEEA) with
2-opt local search to solve the vehicle routing problem with private fleet and common carrier. The main specificities of their method are the flexible local search, the acceptance criterion and the use of a probabilistic model. The authors analyze in their algorithm the contributions of these specificities to its performance. The hybridization of the IDEEA and the 2-opt local search is evaluated and its robustness is shown compared to well-known effective algorithms of combinatorial optimization.

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