
Editorial

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Biographical notes: Christine Mumford is a Senior Lecturer at Cardiff University in the School of Computer Science and Informatics. Prior to joining Cardiff, she was an Assistant Visiting Professor at George Mason University, Virginia, USA, and before that she lectured at the University of Teesside in Middlesbrough, UK. She received her PhD from Imperial College London in 1995, and since then has authored many papers. Her research interests focus on metaheuristic algorithms for combinatorial optimisation problems, particularly vehicle routing, logistic network design, scheduling, timetabling and cutting and packing. She is a Senior Member of the IEEE.

Welcome to the inaugural issue of *IJMHeur*

I am delighted to introduce this inaugural issue of the *International Journal of Metaheuristics*. *IJMHeur* aims to publish high quality papers covering all aspects of metaheuristic methods and their applications, with a particular emphasis on advancing the understanding of metaheuristic algorithms in the research community. *IJMHeur* places special importance on robust methodologies, so that the need for substantial parameter retuning for every problem instance is avoided. Rigorous scientific method is vitally important, and authors are encouraged to assess the limitations as well as the strengths of their proposed methods, presenting statistical validation of results whenever possible.

In general, we consider a metaheuristic to be an algorithmic framework that can be directed towards a broad range of optimisation problems, (ideally) with relatively few modifications. Typical examples are evolutionary algorithms, tabu search, simulated annealing, variable neighbourhood search, and many more. In practice however, successful metaheuristic applications frequently depend on suitable problem-specific low level heuristics embedded within the framework. An enlightened researcher will select only the most appropriate of these components, and build an elegant and efficient design that is both memorable and straightforward for other researchers to replicate.

In this issue

We are very fortunate to be publishing some truly leading-edge research in this first issue of the journal.

The first paper, by Fred Glover and Jin-Kao Hao entitled ‘Efficient evaluations for solving large 0–1 unconstrained quadratic optimisation problems’ introduces a novel fast

evaluation strategy designed to assess moves in metaheuristic search algorithms applied to binary unconstrained quadratic optimisation problems (UQPs). The UQP has many practical applications, making this idea potentially very useful. Indeed its efficiency has already been demonstrated by the authors who have integrated the fast evaluation scheme into their own tabu search algorithm for the UGP.

The second paper: ‘Heuristics for the bandwidth colouring problem’, by Rafael Martí, Francisco Gortazar and Abraham Duarte presents heuristic procedures based on both the GRASP and the tabu search methodologies to provide high quality solutions to the bandwidth coloring problem, and explores the potential of memory structures in both the construction and the improvement phases of heuristic search.

In the third paper, Thijs Uurlings, Rubén Ruiz and Funda Sivrikaya Şerifoğlu tackle a highly complex real world problem involving flowshop scheduling, implementing a genetic algorithm and experimenting with different representation schemes. In this paper entitled ‘Genetic algorithms with different representation schemes for complex hybrid flexible flow line problems’ the authors introduce some advanced genetic algorithms capable of handling multiple constraints. The results favour simple representation schemes for the genetic algorithm and demonstrate the superiority of the new approach over all tested heuristics.

Paper number four deals with the vehicle routing problem with split demands. It uses a population-based approach to locate attractive solution attributes with which to construct new solutions. As the search progresses, the solution set evolves, with better solutions moving into the set and bad solutions being removed. The proposed learning procedure was tested on benchmark instances and performed well when its solutions are compared to those reported in the literature. This paper, called ‘A tabu search with vocabulary building approach for the vehicle routing problem with split demands’ is written by Rafael E. Aleman and Raymond R. Hill.

The final paper also deals with vehicle routing: this time a very complex variation called the multi-depot capacitated arc routing problem. The paper is entitled ‘New upper bounds for the multi-depot capacitated arc routing problem’ and is written by Ali Kansou and Adnan Yassine. This work concentrates on two different methods for calculating two good upper bounds. The first one is based on ant colony optimisation (ACO) combined with an insertion heuristic, and the second one is a memetic algorithm based on a special crossover, able to change the service depots of each task, and to improve the routes associated to each depot.

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