
Editorial

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Biographical notes: Laura Nuñez-Letamendia is Associate Professor at the Department of Finance of IE Business School in Madrid and visiting scholar at Bentley University in Boston. She has numerous publications in international peer review journals as *European Journal of Operational Research*, *Computational Statistics & Data Analysis*, *Soft Computing*, *Energy Policy*, *IMA Journal of Management Mathematics*, *Int. J. Data Mining, Modelling and Management*, etc. She has been member and/or Principal Researcher in research projects funded by public calls, as several projects from the European Commission Framework Program, National Plan of R&D or Local Plan of R&D. Her research interests include evolutionary computation and related metaheuristics and their applications in different domains, mainly, economics, finance and business.

José Ignacio Hidalgo holds a graduate degree in Physics (BS in Physics and MS in Electrical Engineering), and a PhD in Physics (Programme in Computer Science). He has about 17 years of research experience in the field of systems design, evolutionary computation techniques and asynchronous and power aware processors. Currently, he is an Associate Professor of Computer Architecture and Technology at the Department of Computer Architecture and System Engineering, Complutense University of Madrid (Madrid, Spain). Over the last years, he has published more than 100 papers and works on the subjects of evolutionary computation, parallel genetic algorithms, systems design and power reduction techniques.

Solving complex problems of different kind (optimisation, classification, learning, etc.) is nowadays a task of major importance in academy and industry, in domains like logistics, telecommunications, economy, bioinformatics, medicine, etc. In this context, an increasing demand for more sophisticated solvers has emerged. For this reason, research on 'evolutionary computation and related metaheuristics' (the focus of this special issue) is not surprisingly rising. Among the many families of metaheuristics, the use of evolutionary computation (EC) methods has been particularly intense in the last decade aiming to solve problems of high dimensionality. The true power of EC lies in that

exploration (diversification) and exploitation (intensification) are evenly balanced during the search process.

This special issue presents new research lines that cover both novelty EC and related metaheuristics methods and complex applications in different domains. The purpose is to describe in depth some of the most interesting work in this field rather than to attempt a complete or exhausted classification of new EC methods and applications.

The ‘intelligent water drops’ algorithm, which mimics the actions and reactions among natural water drops in rivers, is used by Hamed Shah-Hosseini to modify the well known K-means algorithm, for its application in data clustering problems with several datasets, obtaining a performance superior to the one reported by the pure K-means algorithm. In addition, the proposed algorithm shows no dependence to initial conditions, although its convergence takes longer.

A pure evolutionary memetic algorithm based on a genetic algorithm (GA) improved with a local search approach based too on a GA is used by Sadjia Benkhider and Habiba Drias for the rules extraction problem in the classification context using several datasets. A substantial improvement in both, accuracy of classifiers and running times is obtained comparing with a standard GA.

J. Bagyamani, K. Thangavel and R. Rathipriya remark that with the advent of the ‘Age of Genomics’ the analysis of gene expression data is basic in areas like drug discovery or clinical applications. Biclustering, a relatively new technique, assigns individual genes to multiple clusters, helping to discover useful information related to the function of genes. A hybrid EC algorithm designed by merging a Genetic algorithm with a Simulated Annealing is used to extract significant biclusters, outperforming the results obtained by greedy approaches and even by pure GA.

Sidhartha Panda, P.K. Mohanty and B.K. Sahu present the coordinated design of power system stabiliser (PSS) and a static synchronous compensator (STATCOM)-based controller for power system stability improvement. The novelty of the work is the formulation of the problem as a parameter constrained, simulation-based, non-linear optimisation problem and the use of a bacteria foraging optimisation algorithm (BFOA). BFOA is inspired by the social foraging behaviour of *Escherichia coli* bacteria. Experimental results show an improvement in the system damping and robustness to variation in operating conditions and fault clearing sequence. The coordinated design problem is also extended to a four-machine two-area system.

Finally, the work entitled ‘A dynamic resource constrained project scheduling problem’ written by André Renato Villela da Silva and Luiz Satoru Ochi presents a variant of classical scheduling problems which deal with restricted resources (DRCPSP – dynamic resource constrained project scheduling problem). The proposed model has no upper bound for the amount of available resources. Authors propose the mathematical formulation of the problem, a randomised constructive algorithm, and three versions of evolutionary algorithms with very promising computational results.

We hope this special issue on ‘evolutionary computation and related metaheuristics’ helps the readers in both academy and industry to deal with new ideas and applications to solve complex problems in other domains.