Preface

Rosa M. Rodríguez*

Department of Computer Science,
University of Jaén,
Campus las lagunillas s/n, 23071 Jaén, Spain
Email: rmrodrig@ujaen.es
*Corresponding author

Nesrin Halouani

Higher Institute of Business Administration,
L.O.G.I.Q Unit, University of Sfax,
Route de l'aéroport km 4, BP 1013, Sfax, Tunisia
Email: halouani.nesrin@gmail.com

Isis Truck

CHArt EA 4004,
University Paris 8, 2 rue de la Liberte,
93526 SAINT-DENIS cedex, France
Email: isis.truck@univ-paris8.fr

Biographical notes: Rosa M. Rodríguez received her BSc, MSc and PhD degrees in Computer Science, all of them from the University of Jaén in 2006, 2008 and 2013. Currently, she has a Posdoctoral contract (Ramón y Cajal) at the University of Jaén, Spain. Her main research interests include linguistic preference modelling and decision support systems. She has more than 30 publications in journals indexed by SCI. She is an Editor Assistant in *International Journal of Computational Intelligence Systems* and Associate Editor in *International Journal of Fuzzy Systems* and *Journal of Intelligent and Fuzzy Systems*. She received the IEEE Transactions on Fuzzy Systems Outstanding Paper Award 2012.

Nesrin Halouani is an Assistant Professor at the Higher Institute of Business Administration of Sfax, Tunisia. She obtained her PhD in 2008 and Habilitation in 2016. Her main research area concerns the multicirtieria decision aid and the fuzzy linguistic information. She published several papers in international journals and several participations in international conferences have been released on this topic.

Isis Truck is a Full Professor after a PhD of Computer Science in 2002 (University of Reims, France) and a French habilitation in 2011 (Paris 8 university) entitled "Computing with words: towards an end-to-end use of linguistic terms in the reasoning process". She is interested in theory and applications in decision making with linguistic tools such as fuzzy semantic operators and linguistic 2 tuples, in order to achieve a better solution. She has

published about 60 papers in international journals and conferences and has supervised dozens of students. She is an Adjunct Director of the doctoral school called "cognition language and interaction" at Paris 8 university.

Decision-making is a common task related to intelligent and complex activities in which human beings face situations where they must choose among different alternatives by means of reasoning and mental processes. *Operations research* is a field that uses advanced analytical approaches to support the decision-making processes. Operations research models are able to improve such processes reducing the risk of making erroneous decisions. Therefore, operations research encompasses a wide range of techniques and methods such as fuzzy approaches and optimisation algorithms, which are applied in the pursuit of improving the decision-making processes and their efficiency.

Thus, operation research in decision-making has been widely studied from different points of view according to the framework in which it should be developed. However, there are still different open challenging problems related to this field due to the necessity of dealing with novel decision-making problems or with advances in operations research that imply improvements regarding previous approaches.

This special issue is devoted to the 'Advances in operations research' to address such open problems including technologies, applicability of the approaches and their applications, sharing novel ideas, original research results and practical experiences. It encompasses six high quality papers in different related topics of the scope.

Halouani studies the use of hesitant linguistic information in the paper 'A developed multi-criteria group decision-making method based on interval valued hesitant fuzzy linguistic term sets and mentality parameter', in which the concept of interval valued hesitant fuzzy linguistic term sets is defined taking the advantages from intuitionistic fuzzy sets and hesitant fuzzy linguistic term sets. This kind of information models the uncertainty and hesitation present in the preferences that experts elicit in decision-making problems. A multi-criteria decision-making model dealing with interval valued hesitant fuzzy linguistic term sets is proposed and its applicability is shown by means of an example.

Subsequently, Debnath et al. propose in the paper entitled 'A FEPQ model of sustainable items with time and stock dependent demand under trade credit policy', a new fuzzy economic production quantity model of sustainable items under time dependent quadratic rate of demand and exponential cost. The model uses the generalised Hukuhara derivative approach and a genetic algorithm to solve the cost function. The proposed model is compared with some existing ones.

Afterwards, in 'Self-adaptive bee colony optimisation algorithm for the flexible job-shop scheduling problem', Alzaqebah et al. present a novel approach for flexible job shop schedule problem by means of the bee colony optimisation algorithm in which each forager bee communicates with other bees in a step-by-step solution by performing a dance when they come back to the hive. An adaptive process to improve the neighbourhood search is introduced to avoid local optimum. The proposed algorithm is compared with other existing algorithms by using different datasets to show its performance.

Padmavathi and Sivakumar focus on queuing theory and propose in the paper entitled 'A postponed inventory system with modified M vacation policy', a system with single server under modified M vacation policy. The server can take nearly M inactive mode

which consists of two periods, idle and vacation. The idle period makes the server available immediately after the replenishment. On the contrary, when the replenishment takes place during the vacation period, the server becomes available only after the end of the vacation period. This characteristic makes the model more realistic in practice.

Senthilvel et al. present in the paper 'Dynamic analysis to set idle time between jobs on a single machine', a technique to introduce idle time to complete the job in due date minimising the penalty. In order to show the effectiveness of the proposed algorithm, 400 sets of different sizes are used to carry out a comparison with other existing algorithms.

Finally, in 'Solving industrial multiprocessor task scheduling problems using an improved monkey search algorithm', Marichelvam and Geetha define a monkey search algorithm to minimise the makespan. In order to improve the results dispatching rules and constructive heuristics are included in the algorithm. The proposed algorithm is applied to an industrial problem, random problems and benchmark problems and in all the cases the proposed algorithm gets better results.

We really hope this special issue will contribute to demonstrate and stimulate the field to address new research challenges for operations research.

The guest editors thank all the contributors for their effort in submitting high quality papers, all the reviewers for their careful and constructive comments to further enhance the quality of the papers, and Professor Angappa Gunasekaran, Editor-in-Chief of *International Journal of Operational Research*, for his valuable assistance in the organisation of this special issue.