Foreword

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Biographical note: Ahmad Rezaee Jordehi was born in 1980, received his BSc and MSc in electrical power engineering, from Shahid Chamran University, Ahvaz, Iran in 2002 and 2005, respectively. He received his PhD in electrical power engineering from University Putra Malaysia, Selangor, Malaysia in 2014. He is currently an Assistant Professor in Department of Electrical Engineering, Lashtenesha-Zibakenar Branch, Islamic Azad University, Lashtenesha, Iran. His main research interests are power system optimisation, metaheuristic optimisation algorithms and renewable energy systems.

Optimisation problems exist everywhere; in all areas of science and technology. Real-world optimisation problems are typically multi-modal, multi-objective and constrained problems that are difficult to be solved. Classic optimisation algorithms such as linear programming, non-linear programming and dynamic programming are not efficient in solving difficult real-world optimisation problems. Metaheuristic optimisation algorithms are the most popular approaches for solving difficult real-world optimisation problems. They are typically population-based, bio-inspired and stochastic algorithms that try to find near-global solutions in search space. The application of metaheuristics to engineering problems is increasing. Those applications can be classified into two categories; researches that apply the existing metaheuristics to the problems and those which develop a novel metaheuristic or novel variant of a metaheuristic and apply it to a problem. The second category of research works try to mitigate premature convergence problem which is considered as a salient drawback of metaheuristic optimisation algorithms.

This special issue covers engineering applications of bio-inspired metaheuristic optimisation algorithms. It includes five research articles.

In 'Enriched Artificial Bees Colony Metaheuristic for Hierarchical Goal Programming Engineering Design', by Dhouib et al. a novel variant of artificial bee colony (ABC) algorithm, named as great deluge ABC, is developed and proposed for solving four different engineering design optimisation problems. In the proposed ABC variant, the performance of onlooker bees is changed in order to enhance the explorative capability of algorithm. The results testify that the proposed ABC variant outperforms conventional ABC.

In 'An Empirical Study of Population-Based Metaheuristics for the Multiple-Choice Multidimensional Knapsack Problem', Vasko et al. compare the performance of five different metaheuristic optimisation algorithms, including teaching - learning-based optimisation (TLBO), bat swarm optimisation (BSO), crisscross optimisation algorithm

(COA), genetic algorithm (GA) and artificial bee colony (ABC) in solving multiple choice, multi-dimensional knapsack problem. The results indicate that TLBO, GA and COA outperform ABC and BSO.

In 'Bi-criteria Parallel Machine Scheduling using Nature-Inspired Hybrid Flower Pollination Algorithm', Jeet et al. propose a hybrid of flower pollination algorithm and genetic algorithm for scheduling jobs in parallel machines. The job scheduling problem is formulated as a bi-objective optimisation problem. The results approve that the proposed algorithm outperforms genetic algorithm and particle swarm optimisation.

In 'Prediction of the Bottled Propane Gas Sales Using a Neural Networks Based Model', Paggi et al. present an application of artificial neural networks for predicting the time series of the weekly wholesales of bottled propane gas. Several network topologies and ensemble schemas are studied in order to reduce prediction errors. The input dimensionality problem is also addressed, and considerations about stochastic dynamical systems are included in the model. The authors conclude that one model combining two networks using a linear aggregation schema is able to achieve the best performance results in terms of mean prediction error.

In 'Optimal design of PIDA controller for Induction motor using Spider Monkey Optimization Algorithm', Sharma et al. use a swam intelligence-based metaheuristic optimisation algorithm, referred to as spider monkey optimisation algorithm (SMO), for finding optimal parameters of proportional integral derivative acceleration (PIDA) controllers. The SMO uses local and global leaders in search process. The results indicate that in this problem, SMO outperforms PSO.