Editorial

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Scheduling is a form of decision-making process, which is to allocate limited resources to tasks over time and to determine the sequence of operations so that the constraints of the system are satisfied and the performance criteria are optimised as well. It plays a crucial role in manufacturing and service industries. Due to most of real-world scheduling problems being NP-hard, metaheuristic or intelligent optimisation algorithms, such as genetic algorithms, particle swarm optimisation, differential evolution, iterated greedy, iterated local search and variable neighbourhood search, have attracted attention and been extensively used to deal with such problems. However, the scientific community still observes a noticeable gap between the research and practice.

This special issue aims to reflect the state-of-the-art of the advanced intelligent optimisation research to solve real-world scheduling problems, aiming to bridging the gap between theory and practice.

The first paper titled 'Research of local shadow MPPT of photovoltaic array based on EV-IKMTOA' by Yi et al. proposes a multi-modal MPPT optimisation strategy based on improved molecular dynamic optimisation algorithm to maximise power point output of the photovoltaic array.

The second paper titled 'An evolutionary algorithm for a hybrid flowshop scheduling problem with consistent sublots' by Zhang et al. proposes an algorithm integrating the migrating birds optimisation and variable neighbourhood descent algorithms to minimise the maximal completion time of a hybrid flowshop scheduling problem with consistent sublots, taking account of both lot sequence and lot splitting.

The third paper titled 'Bi-level programming model for post-disaster emergency supplies scheduling with time windows and its algorithm' by Wang et al. establishes a bi-level programming model with time window constraints for the emergency supplies scheduling problem in disaster situation, with the minimum system response time as the upper objective and the minimum total system cost as the lower objective.

The fourth paper titled 'Scheduling problems with rejection and piece-rate maintenance to minimise the total weighted completion time' by Yu et al. considers a single machine scheduling problem with rejection and piece-rate maintenance. The target is to minimise the sum of weighted completion times, rejection costs and maintenance costs. For the general case, the problem is proved to be NP-hard, and an approximate solving algorithm is developed. For the case with agreeable process times and weights in such a way that jobs with smaller processing times are weighted more, a pseudo-polynomial algorithm is developed.

The last paper titled 'Research on steelmaking-continuous casting production scheduling problem with uncertain processing time based on Lagrangian relaxation framework' by Sun et al. solves a steelmaking-continuous casting problem with uncertain processing time and proposes a mixed integer programming modelling method based on the charge decomposition strategy. To reduce the scheduling scale, reduce the difficulty of scheduling, improve the quality of solution and the speed of computing, this research proposes an improved Lagrangian relaxation method to study the processing time.

We would like to thank the Editor-in-Chief, for providing us the opportunity to guest-edit this special issue and great assistance during the process. We are also grateful to all the authors for their valuable contributions and to the reviewers for their valuable comments that have greatly helped to improve the quality of papers. We hope that the papers included in this issue would promote the research of intelligent methods for the scheduling problems.