# Editorial

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Intelligent information processing is a forefront interdisciplinary research topic in computer science. It is a comprehensive application-oriented discipline. Its goal is to deal with massive and complex information, and develop new and advanced theories and technologies. In recent years, it has increasingly been combined with artificial intelligence technologies to allow computer systems to more intelligently process information. Intelligent information processing research covers fundamental theories, application-oriented theories, key technologies and applications at multiple levels. Not only the high theoretical research value, but also the infrastructures for countries' economies are of great importance.

We believe that the series of works in this special issue provide a useful reference for understanding recent advances on intelligent information systems. In total, five papers have been selected to reflect the call thematic vision. The contents of these studies are briefly described as follows.

Artificial physics optimisation (APO) algorithm is a novel population-based stochastic algorithm based on physicomimetics framework for multidimensional search and optimisation. APO invokes a gravitational metaphor in which the force of gravity may be attractive or repulsive, the aggregate effect of which is to move individuals toward local and global optima. In the paper, 'The convergence analysis of artificial physics optimisation algorithm', Liping Xie, Ying Tan, Jianchao Zeng and Zhihua Cui present a proof of convergence that reveals the conditions under which APO is guaranteed to converge. By regarding each individual's position on each evolutionary step as a stochastic vector, APO algorithm determined by non-negative real parameter tuple $\{m_i, w, G\}$ is analysed using discrete-time linear system theory. The convergent condition of APO algorithm and corresponding parameter selection guidelines are derived. The simulation results show that the convergent condition is effective in guiding the parameter selection of APO algorithm and can help to explain why those parameters work well.

In the paper, 'Computing optimal coalition structures in non-linear logistics domains', Chattrakul Sombattheera studies computing optimal coalition structures in non-linear logistics domains where coalition values are not known a priori and computing them is NP-Hard problem. The common goal of the agents is to minimise the system's cost. Agents perform two steps:

1 deliberate appropriate coalitions

2 exchange computed coalitions and generate coalition structures.

The concept of best coalition is applied to work in the non-linear logistics domain. An algorithm is introduced to explain via examples to show it works.

Inspired by the information prediction existing in the nature intelligent agents, in the paper, 'Comprehensive analysis for modified particle swarm optimisation with PD controllers', Jing Jie and Wanliang Wang have developed a modified particle swarm optimisation (PSO) with a forward PD controller (PSO-FWPD) earlier. Comprehensive analysis for the model is provided in the paper, including its stabilisation, convergence and dynamic behaviour. Later, another modified PSO with a feedback PD controller (PSO-FBPD) is presented companying some analysis. The introductions of different PD controllers develop the standard PSO (SPSO) with information prediction capability, which can guide the particle to respond to the change of their exemplars correctly and rapidly, and greatly contributes to a successful global search. The proposed methods provide some new ideas for the improvement of SPSO, and are compared with SPSO based on some numerical optimisation simulations. The relative experimental results show SPSO with different PD controller performs better than SPSO on the complex optimisation problems.

Particle swarm optimiser (PSO) has shown good performance in lots of optimisation problems. However, it easily suffers from premature convergence when solving complex optimisation problems. In order to improve the performance of PSO, in this paper, 'Particle swarm optimiser with hybrid multi-parent crossover and discrete recombination', Dazhi Jiang, Sanyou Zeng, Hui Wang and Zhijian Wu present an enhanced evolutionary algorithm named as PSO with hybrid multi-parent crossover and discrete recombination (PSOHMCDR), which is based on the characteristics of PSO, multi-parent crossover algorithm and differential evolution (DE). Experimental results show that PSOHMCDR outperforms other nine algorithms, including six PSO variants and three typical and effective DE variants.

Many real-world problems are dynamic and multi-objective, which requires an optimisation algorithm to be able to continuously track the changing Pareto optimal set (POS) and Pareto optimal front (POF) over time. In this paper, 'Multi-swarm co-evolutionary paradigm for dynamic multi-objective optimisation problems' authored by Chengyu Hu, Qingzhong Liang, Yuanyuan Fan and Guangming Dai, a new variant of particle swarm optimisation (PSO) has been specifically designed by adaptively switching from competitive model to cooperative model to track for both POS and POF. In the proposed method, the competition is used to explore the search space, while the cooperation is applied to exploit the search space. The dynamic multi-objective functions are constructed to test the performance of the proposed algorithm. Both theoretical analysis and the numerical experiment have shown that the proposed algorithm is an excellent alternative for solving the dynamic multi-objective optimisation problems. Finally, the proposed method has been applied to the tuning of the parameters of PID controller for dynamic system in which a satisfactory control is obtained.

For this special issue, we received abundant responses from researchers. Among them, five papers were accepted and are included in this special issue. Overall, we feel that these papers cover quite a spectrum of, what is, a novel yet highly important research field. We would like to thank the editor-in-chief, Ngoc Thanh Nguyen, for his supports in putting together this special issue, we would also like to express our deepest gratitude to

many reviewers who helped us in the reviewing process for this special issue. Their expertise and professional comments guaranteed the high quality of the selected papers. The editors of this special issue have been supported by National Natural Science Foundation of China (No. 61003053) and the Key Project of Chinese Ministry of Education (No. 209021).