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A Competitive Mechanism Based Multi-objective Particle Swarm Optimizer with Fast Convergence

Xingyi Zhang^a, Xiutao Zheng^a, Ran Cheng^{b,*}, Jianfeng Qiu^a, Yaochu Jin^c

^aKey Lab of Intelligent Computing and Signal Processing of Ministry of Education, School of Computer Science and Technology, Anhui University, Hefei 230039, China

^bSchool of Computer Science, University of Birmingham, Birmingham, B15 2TT, U.K.

^cDepartment of Computer Science, University of Surrey, Guildford, Surrey, GU2 7XH, U.K.

Abstract

In the past two decades, multi-objective optimization has attracted increasing interests in the evolutionary computation community, and a variety of multi-objective optimization algorithms have been proposed on the basis of different population based meta-heuristics, where the family of multi-objective particle swarm optimization is among the most representative ones. While the performance of most existing multi-objective particle swarm optimization algorithms largely depends on the global or personal best particles stored in an external archive, in this paper, we propose a competitive mechanism based multi-objective particle swarm optimizer, where the particles are updated on the basis of the pairwise competitions performed in the current swarm at each generation. The performance of the proposed competitive multi-objective particle swarm optimizer is verified by benchmark comparisons with several state-of-the-art multi-objective optimizers, including three multi-objective particle swarm optimization algorithms and three multi-objective evolutionary algorithms. Experimental results demonstrate the promising performance of the proposed algorithm in terms of both optimization quality and convergence speed.

Keywords: Multi-objective optimization, Competitive swarm optimizer,

*Corresponding author.

Email addresses: xyzhanghust@gmail.com (Xingyi Zhang), zxt0086@outlook.com (Xiutao Zheng), ranchengcn@gmail.com (Ran Cheng), qiujianf@ahu.edu.cn (Jianfeng Qiu), yaochu.jin@surrey.ac.uk (Yaochu Jin)

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