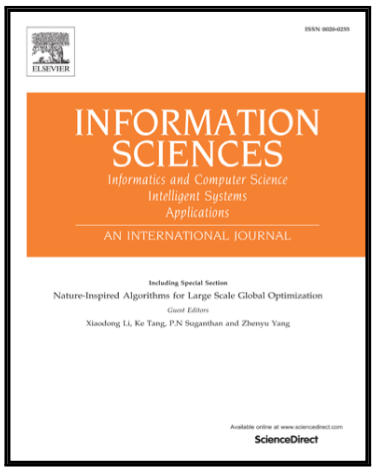

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PII: S0020-0255(18)30525-5
DOI: 10.1016/j.ins.2018.07.012
Reference: INS 13779

To appear in: *Information Sciences*

Received date: 31 January 2018
Revised date: 30 June 2018
Accepted date: 7 July 2018

Please cite this article as: Chong Zhou, Guangming Dai, Cuijun Zhang, Xiangping Li, Ke Ma, Entropy Based Evolutionary Algorithm with Adaptive Reference Points for Many-Objective Optimization Problems, *Information Sciences* (2018), doi: 10.1016/j.ins.2018.07.012

Entropy Based Evolutionary Algorithm with Adaptive Reference Points for Many-Objective Optimization Problems

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Abstract

Many-objective optimization problems (MaOPs) have attracted more and more attention due to its challenges for multi-objective evolutionary algorithms. Reference points or weight vectors based evolutionary algorithms have been developed successfully for solving MaOPs. However, these algorithms don't solve efficiently the MaOPs with irregular Pareto fronts, such as disconnected, degenerate, and inverted. Although some algorithms with adaptive weight vectors or reference points are designed to handle the problems with irregular shapes of Pareto fronts, they still exist some drawbacks. These adaptive algorithms don't obtain good performance in solving regular problem. For solving regular and irregular Pareto fronts of the problems, a novel entropy based evolutionary algorithm with adaptive reference points, named EARPEA, is proposed to solve regular and irregular many-objective optimization problems. Entropy computed based on reference points and a learning period are employed to control adaptation of the reference points. In addition, in order to maintain diversity of the reference points, a reference point adaptation method based on cosine similarity is designed in the adjusting reference point phase. The proposed algorithm

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