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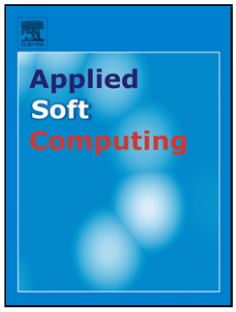

Title: A Many-objective Evolutionary Algorithm Based on Rotated Grid

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PII: S1568-4946(18)30090-5
DOI: https://doi.org/doi:10.1016/j.asoc.2018.02.031
Reference: ASOC 4723

To appear in: *Applied Soft Computing*

Received date: 17-3-2017
Revised date: 29-1-2018
Accepted date: 17-2-2018

Please cite this article as: Juan Zou, Liuwei Fu, Shengxiang Yang, Jinhua Zheng, Guo Yu, Yaru Hu, A Many-objective Evolutionary Algorithm Based on Rotated Grid, *<![CDATA[Applied Soft Computing Journal]]>* (2018), https://doi.org/10.1016/j.asoc.2018.02.031

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A Many-objective Evolutionary Algorithm Based on Rotated Grid

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Abstract

Evolutionary optimization algorithms, a meta-heuristic approach, often encounter considerable challenges in many-objective optimization problems (MaOPs). The Pareto-based dominance loses its effectiveness in MaOPs, which are defined as having more than three objectives. Therefore, a more valid selection method is proposed to balance convergence and distribution. This paper proposes an algorithm using rotary grid technology to solve MaOPs (denoted by RGridEA). The algorithm uses the rotating grid to partition the objective space. Instead of using the Pareto non-dominated sorting strategy to layer the population a novel stratified method is used to enhance convergence effectively and make use of the grid to improve distribution and uniformity. Finally, with the other seven algorithm was tested on the test function DTLZ series analysis, confirming RGridEA is effective in resolving MaOPs.

Keywords: Many-objective optimization; evolutionary algorithms; clustering; genetic algorithms; Multi-objective optimization

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