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PII: S0305-0548(14)00104-X
DOI: http://dx.doi.org/10.1016/j.cor.2014.04.013
Reference: CAOR3554

To appear in: *Computers & Operations Research*

Cite this article as: Yu-Jun Zheng, Hai-Feng Ling, Jin-Yun Xue, Ecogeography-Based Optimization: Enhancing Biogeography-Based Optimization with Ecogeographic Barriers and Differentiations, *Computers & Operations Research*, http://dx.doi.org/10.1016/j.cor.2014.04.013

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# Ecogeography-Based Optimization: Enhancing Biogeography-Based Optimization with Ecogeographic Barriers and Differentiations

Yu-Jun Zheng[a,*], Hai-Feng Ling[b], Jin-Yun Xue[c]

[a] *College of Computer Science & Technology, Zhejiang University of Technology, Hangzhou 310023, China*
[b] *College of Field Engineering, PLA University of Science & Technology, Nanjing 210007, China*
[c] *Jiangxi Provincial Lab of High-Performance Computing, Jiangxi Normal University, Nanchang 330022, China*

Accepted manuscript

**Abstract**

Biogeography-based optimization (BBO) is a bio-inspired metaheuristic based on the mathematics of island biogeography. The paper proposes a new variation of BBO, named ecogeography-based optimization (EBO), which regards the population of islands (solutions) as an ecological system with a local topology. Two novel migration operators are designed to perform effective exploration and exploitation in the solution space, mimicking the species dispersal under ecogeographic barriers and differentiations. Experimental results show that the EBO outperforms the basic BBO and several other popular evolutionary algorithms (EAs) on a set of well-known benchmark problems. We also present a real-world application of the proposed EBO to an emergency airlift problem in the 2013 Ya'an-Lushan Earthquake, China.

*Keywords:* Global optimization, evolutionary algorithms (EAs), biogeography-based optimization (BBO), emergency airlift.

## 1. Introduction

Nature-inspired computing has been fascinating computer scientists for a long time, giving rise to popular areas such as artificial neural networks

*Corresponding author. Tel.: +86-571-85290085.
*Email address:* yujun.zheng@computer.org (Yu-Jun Zheng)

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