

## Article

# A novel method for large scale optimization problems, based on Differential Evolution

Glykeria Kyrrou<sup>1</sup>, Vasileios Charilogis<sup>2</sup> and Ioannis G. Tsoulos<sup>3,\*</sup>

<sup>1</sup> Department of Informatics and Telecommunications, University of Ioannina, 47150 Kostaki Artas, Greece; g.kyrrou@uoi.gr

<sup>2</sup> Department of Informatics and Telecommunications, University of Ioannina, Greece; v.charilog@uoi.gr

<sup>3</sup> Department of Informatics and Telecommunications, University of Ioannina, 47150 Kostaki Artas, Greece; itsoulos@uoi.gr

\* Correspondence: itsoulos@uoi.gr

**Abstract:** Global optimization is fundamental to engineering and computer science as it seeks to find better solutions to both simple and complex problems. It aims to find the most effective and efficient solution to any problem. In this paper we present a variation of the differential evolution algorithm for large-scale Global Optimization problems. Differential Evolution (DE) is a universal optimization algorithm that is applied to many practical engineering topics. The DE algorithm is a population-based algorithm like genetic algorithms and uses similar operators such as: crossover, mutation and selection. In this work, a series of modifications are proposed that aim to improve the reliability and speed of the above technique. The new method was tested on a series of large-scale problems and compared with other global optimization techniques with promising results. More specifically, the proposed algorithm has been evaluated by typical high-dimensional numerical optimization problems. The functions used are from the CEC-2010 competition for Large-Scale Global Optimization problems.

**Keywords:** Optimization; Differential evolution; Evolutionary techniques; Stochastic methods; Large-Scale problems;

**Citation:** Kyrrou, G.; Charilogis, V.; Tsoulos, I.G. A novel method for large scale optimization problems, based on Differential Evolution. *Journal Not Specified* **2024**, *1*, 0. <https://doi.org/>

Received:

Revised:

Accepted:

Published:

**Copyright:** © 2024 by the authors. Submitted to *Journal Not Specified* for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).