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

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**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;

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## Appendix A

*Appendix A.1*

The appendix is an optional section that can contain details and data supplemental to the main text—for example, explanations of experimental details that would disrupt the flow of the main text but nonetheless remain crucial to understanding and reproducing the research shown; figures of replicates for experiments of which representative data are shown in the main text can be added here if brief, or as Supplementary Data. Mathematical proofs of results not central to the paper can be added as an appendix.

**Table A1.** This is a table caption.

| Title 1 | Title 2 | Title 3 |
|---|---|---|
| Entry 1 | Data | Data |
| Entry 2 | Data | Data |

## Appendix B

All appendix sections must be cited in the main text. In the appendices, Figures, Tables, etc. should be labeled, starting with "A"—e.g., Figure A1, Figure A2, etc.

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