

# **A Sensibility Analsys of Differential Evolution with Enhanced Diversity Maintenance**

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Differential Evolution (DE) is a popular population-based meta-heuristic that has been successfully used in complex optimization problems. Premature convergence is one of the most important drawbacks that affects its performance. In this paper, a novel replacement strategy that combines the use of an elite population and a mechanism to preserve diversity explicitly is devised. The proposal is integrated with DE to generate the DE with Enhanced Diversity Maintenance (DE-EDM). The main novelty is the use of a dynamic balance between exploration and exploitation to adapt the optimizer to the requirements of the different optimization stages. Experimental validation is carried out with several benchmark tests proposed in competitions of the well-known IEEE Congress on Evolutionary Computation. Top-rank algorithms of each competition, as well as other diversity-based schemes, are used to illustrate the usefulness of the proposal. The new method avoids premature convergence and significantly improves further the results obtained by state-of-the-art algorithms.