

PERFORMANCE ANALYSIS OF SURROGATE ASSISTED DIFFERENTIAL EVOLUTION (SADE) OPTIMIZER WITH ADDITIONAL INDIVIDUALS UPDATE POSSIBILITY WHEN DEALING WITH ROSENBROCK'S BENCHMARK FUNCTION IN 5D-10D

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Abstract

Surrogate model assisted evolutionary algorithms have recently attracted much attention due to the growing need for computationally expensive optimization in many real-world applications. Within this framework, a Gaussian process surrogate model assisted evolutionary algorithm for computationally expensive optimization problems (Surrogate Assisted Differential Evolution, SADE) has been implemented. Its major components are a surrogate model-aware search mechanism for expensive optimization problems when a high-quality surrogate model is difficult to build. A new framework is developed and used in SADE, which carefully coordinates the surrogate modeling and the evolutionary search, so that the search can focus on a small promising area and is supported by the constructed surrogate model. Compared to other state-of-the-art EAs, similar solutions can be obtained with a significant reduction of exact function evaluations. The aim of this project is to test the performances of SADE algorithm when dealing with the ROSENBROCK's benchmark function, both in 5D and in 10D, considering different configurations of the optimizer (introduction of additional update of individuals), as well as compare its performances with classic DE.

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