

AI-Generated Benchmark Functions for Metaheuristic Optimization

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Abstract:

The pursuit of robust metaheuristic algorithms necessitates a comprehensive suite of sophisticated benchmark functions, each embodying diverse and complex fitness landscape features, essential for a rigorous evaluation of their optimization efficacy across various problem domains.

This thesis examines the advancement of artificial intelligence in generating complex benchmark functions for evaluating metaheuristic algorithms. The study delves into how AI techniques, including AI-driven symbolic regression and large language models, can construct test functions that present diverse fitness landscape features crucial for a comprehensive assessment of metaheuristics.

The investigation targets the development of a systematic approach for AI to craft benchmark functions that not only represent a broad spectrum of problem difficulties but also embody specific characteristics of fitness landscapes, such as ruggedness, modality, and deception. These characteristics are essential for gauging the adaptability and robustness of metaheuristic algorithms.

Literature:

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