

An Emerging and Promising Quantum-Inspired Search Algorithm

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Abstract

Metaheuristic algorithms have been widely applied to various optimization problems. However, most metaheuristics require many parameters and exhibit high implementation variability, making tuning and implementation challenging. Among them, Differential Evolution (DE) is known for having fewer parameters and being easy to implement. It has demonstrated stable performance across different optimization problems, making it a preferred choice for researchers when dealing with unknown problems.

On the other hand, quantum algorithms have shown strong computational potential, significantly accelerating the solving process for specific problems. Inspired by this, our team aims to develop a new quantum-inspired metaheuristic algorithm that incorporates quantum computing principles to achieve low-parameter or even parameter-free optimization. We also ensure that the algorithm is easy to implement and has minimal implementation variability, improving usability and reliability.

Our developing algorithm has begun to take shape and has undergone preliminary testing on various optimization problems, demonstrating its stability. Additionally, we have identified several characteristics similar to those found in quantum algorithms, which may be further explored in future research. Preliminary results suggest that this approach has the potential to evolve into a viable alternative to DE and provide a new direction for the development of future optimization algorithms.