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Authors:
Md. Wasi Ul Kabir

Mohammad Shafiul Alam

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Abstract

Swarm intelligence is an emerging research field that tries to mimic the collective intelligent behavior found in swarms of insects and animals. Many algorithms have been proposed that simulate these intelligent swarm models to solve a wide range of scientific and engineering problems. The Bat algorithm is one of the most recent swarm intelligence based algorithms that simulates the intelligent hunting behavior of the bats found in nature. In this paper, we present an improved self-adaptive Bat algorithm (BA SAM) for the problem of global numerical optimization over continuous domains. We have introduced two improved solution search equations — the BA/Normal/1 and BA/Cauchy/1 schemes. We have also used a selection probability to control the frequency of employing BA/Normal/1 and BA/Cauchy/1, which leads to a new self-adaptive search mechanism for the Bat algorithm. Experiments are conducted on both unimodal and multimodal continuous benchmark functions. The results demonstrate the improved performance of the BA SAM algorithm in comparison to the original Bat algorithm and another recently introduced improved variant of the Bat algorithm.

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Index Terms

Computer Science Algorithms

Keywords

Bat algorithm Numeric optimization Meta-heuristic algorithms Swarm intelligence.