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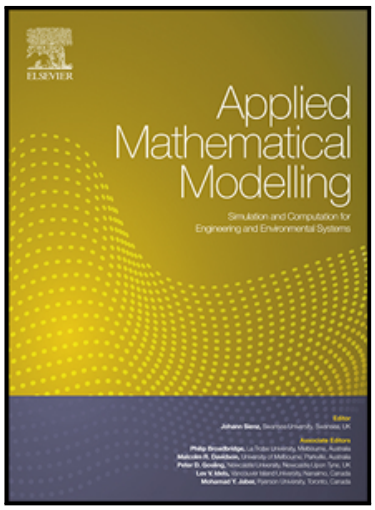

Queuing search algorithm: A novel metaheuristic algorithm for solving engineering optimization problems

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Highlights

- A novel metaheuristic algorithm called queuing search (QS) is proposed, which is inspired from human activities in queuing process.
- QS does not need to preset the other parameters except the population size and stopping criterion.
- Performance of QS is checked for thirty bound-constrained benchmark functions and some constrained engineering optimization problems.
- QS shows the great ability of jumping out of a local optimal solution and searching the global optimum.

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Abstract

This paper presents a novel metaheuristic algorithm called queuing search (QS), which is inspired from human activities in queuing. Some common phenomena are considered in QS: 1) customers actively follow the queue that provides fast service; 2) each customer service is mainly affected by the staff or customer itself; and 3) a customer can be influenced by others during the service when the queue order is not strictly maintained. The performance of QS is tested on 30 bound-constrained benchmark functions scalable with 30 and 100 dimensions from CEC 2014, 5 standard and 4 challenging constrained engineering optimization problems. Meanwhile, comparisons are performed among the results of QS and some state-of-the-art or well-known metaheuristic algorithms.

Keywords: Queuing search algorithm; Metaheuristic algorithms; Engineering optimization

1 Introduction

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