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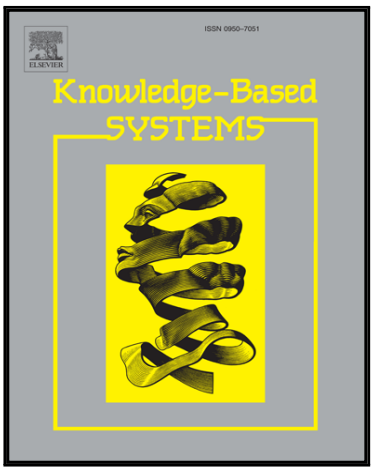

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Optimizing Dam and Reservoirs Operation Based Model Utilizing Shark Algorithm Approach

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Abstract

Computational intelligence (CI) is a fast evolving area in which many novel algorithms, stemmed from various inspiring sources, were developed during the past decade. Nevertheless, many of them are dispersed in different research directions, and their true potential is thus not fully utilized yet. Therefore, there is need investigate the potential of these methods in different engineering optimization problems. In fact, shark algorithm is a stochastic search optimization algorithm which is started first in a set of random generated potential solutions, and then performs the search for the optimum one interactively. Such procedure is appropriate to the system features of the reservoir system as it is a stochastic system in nature. In this article, investigation of the potential of shark algorithm is examined as an optimization algorithm for reservoir operation. To achieve that real single reservoir and multi-reservoir optimal operations have been performed utilizing shark algorithm. Many performances indexes have been measured for each case study utilizing the proposed shark algorithm and another existing optimization algorithms namely, Genetic Algorithm (GA) and Particle Swarm Optimization (PSO). The results showed that the proposed shark algorithm outperformed the other algorithms and achieved higher reliability index and lesser vulnerability index. Moreover, standard deviation and coefficient of variation in Shark Algorithm were less than the other two algorithms, which indicates its superiority.

Keywords: Shark algorithm; multiple-reservoir systems; genetic algorithm; particle swarm algorithm

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