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A NOVEL HYBRID RUN-ABC OPTIMIZATION ALGORITHM

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ABSTRACT

In recent years, with the development of technology, complex and high-dimensional problems have increased. The use of metaheuristic optimization algorithms in solving these complex problems has become an important research area. In this study, a new hybrid RUN-ABC optimization algorithm was developed by combining the RUN (Runge Kutta Optimization) algorithm and the ABC (Artificial Bee Colony) algorithm. By taking into account the powerful exploration capabilities of the ABC algorithm and the efficient exploitation capabilities of the RUN algorithm, the aim was to search for the best solution in a more balanced manner in the search space. Experiments were conducted on five different benchmark functions to evaluate the performance of the hybrid RUN-ABC method. In these experiments, the developed hybrid method ABC and RUN algorithms were compared based on the average best value, standard deviation, and convergence rate. Furthermore, the Wilcoxon signed-rank test (signrank) was applied to measure the performance between the algorithms. The results showed that the developed hybrid RUN-ABC algorithm outperformed both the RUN and ABC algorithms in most cases. The developed method demonstrated impressive performance in terms of achieving a global minimum and the stability of its results. This study demonstrates that the developed hybrid RUN-ABC method can be a powerful alternative and provides a basis for its future use in solving various complex problems.

Keywords: metaheuristic optimization, optimization algorithms, hybrid algorithms