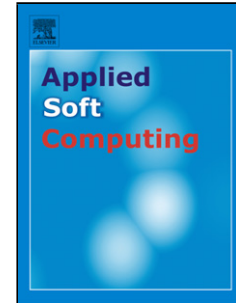# Accepted Manuscript

Title: Solving the Dynamic Weapon Target Assignment
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with Heuristic Factor Initialization

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Solving the Dynamic Weapon Target Assignment Problem by an Improved Artificial Bee Colony Algorithm with Heuristic Factor Initialization

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Highlights

- •Put forward an improved artificial bee colony algorithm based on ranking selection and elite guidance.

- •Put forward 4 rule-based heuristic factors: weapon-choice-priority, target-choice-priority, target-choice-priority with a random sequence, and target-choice-priority with a random sequence and Cannikin Law.

- •The heuristic factors are used in population initialization to improve the quality of the initial solutions in dynamic weapon target assignment solving.

- •The heuristic factor initialization method is combined with the improved ABC algorithm to solve the dynamic weapon target assignment problem with the integer encoding according to the characteristics of dynamic weapon target assignment.

Abstract: Dynamic weapon target assignment (DWTA) is an effective method for solving the problem of battlefield firepower optimization in multiple stages and multiple rounds. The resolving time of the DWTA affects current allocation results and assignment results in the next round. Aiming at the slow convergence rate and the low search efficiency in solving DWTA, this paper proposes an improved artificial bee colony (ABC) algorithm with a new initialization method utilizing rule-based heuristic factors. The traditional ABC algorithm converges slowly and easily falls into local extremum. Therefore, in the study, we firstly put forward an improved ABC algorithm based on ranking selection and elite guidance to improve the search efficiency. Secondly, aiming at the low quality of the initial solution generated randomly, we put forward 4 kinds of rule-based heuristic factors: heuristic factor based on weapon-choice-priority, heuristic factor based on target-choice-priority, heuristic factor based on target-choice-priority with a random sequence, and heuristic factor based on target-choice-priority with a random sequence and Cannikin Law. The heuristic factors are used in population initialization to improve the quality of initial solutions. Finally, the heuristic factor initialization method is combined with the improved ABC algorithm to solve the DWTA problem with the integer encoding according to the characteristics of DWTA. A comparative experiment of different algorithms for solving the DWTA problem with different scales was carried out. The experimental results showed that the improved ABC algorithm combined with heuristic factor initialization could get the high-quality initial solution, accelerate the solution process, and improve the accuracy