

An Improved Vantage Point Bees Algorithm to Solve Combinatorial Optimisation Problems from TSPLIB

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Keywords. combinatorial optimisation problem, metaheuristics, vantage point bees algorithm, traveling salesman problem

Abstract.

This paper presents an improved version of the Vantage Point Bees Algorithm (VPBA-II), which is implemented to solve the Traveling Salesman Problem with the combination of the Vantage Point Tree construction and three different local search operators including swap, insertion, reversion and combination of them. The Vantage Point Tree has been used to produce initial tour solutions and also as a global search operator of the proposed algorithm to find the minimal Hamiltonian tour of the Traveling Salesman Problem. VPBA-II was tested on 15 different benchmark datasets from TSPLIB, particularly for the high dimensional combinatorial solution spaces, and it outperformed the basic Bees Algorithm. The reversion operator combined with Vantage Point Tours performed better except one dataset and achieved optimum results according to best-known solutions of Traveling Salesman Problem as a best-case scenario. The experiments proved that Vantage Point Tour construction could be used as initialization and global search operator to improve the basic Bees Algorithm performance on the combinatorial domains.