

A Logistic Optimization for the Blood Delivery Routing Problem in the Lower Southern Region of Thailand

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Abstract. Blood delivery routes from the Regional Blood Center to hospitals requesting blood and blood products were optimized as a vehicle routing problem with vehicle time restriction constraints. Total costs of blood transportation under the activity-based costing system on the period of use of the vehicle and the traveling distance were minimized. A novel hybrid method was proposed as a combination of the firefly algorithm, a crossover operator in differential evolution and a new local search, called the HFA+NLS algorithm. A set of six generated test instances (small and medium-sized problems) and a real-world case study were used to verify the competitive performance of the proposed algorithm. Computational results revealed that the HFA+NLS algorithm gave a superior performance to other methods in the number of test instances required to successfully find the best-known solution. The HFA+NLS was effective and efficient in solving the blood delivery routing problem with vehicle time restriction constraints.

Keywords: Blood delivery routing, firefly algorithm, crossover, local search, hybrid metaheuristic