DIFFERENTIAL EVOLUTION ALGORITHM DEVELOPMENT FOR SOLVING VEHICLE ROUTING PROBLEM SIMULTANEOUS DELIVERIES PICK-UP WITH TIME WINDOWS (VRPSDPTW)

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ABSTRACT

This research discusses the development of the Differential Evolution algorithm to solve the problem of Simultaneous Delivery Vehicle Routing Problem with Pick-up Time Windows (VRSPDTW). Algorithm development is done by adding the initials of the solution generation technique based on neighborhood algorithm. Characteristics of the neighborhood algorithm used are the earliest due date, earliest open, and the nearest distance. The next modification is to change the process of cross-over into swap mutation and exchange mutation.

While the characteristics VRPSDPTW issue in this study use heterogeneous transport vehicles with the objective function minimizing the total cost of transportation. The amount of the total cost is calculated from the sum of fixed costs and transportation costs and penalty fees. Penalty costs occur when vehicles arrive or leave consumers outside the operational hours of the consumer.

These results confirm that the development of algorithms that do can find a better solution than the solution found by the basic algorithm for the problem VRPSDPTW DE. In addition, the algorithm developed is also able to work well on a number of consumer point 25 and point as many as 100 customers. From the test result a model, an algorithm developed shows a reliable performance in finding a solution on the various input parameter.

Keyword: Differential Evolution algorithm, VRPSDPTW, earliest due date, earliest open, nearest distance, swap, exchange.