DEVELOPING ANT COLONY SYSTEM HEURISTICS ALGORITHM FOR SOLVING DYNAMIC VEHICLE ROUTING PROBLEM WITH TIME WINDOWS (DVRPTW) ON CONSOLIDATION PROCESS OF INTER-CITY COURIER SERVICE PROVIDER

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ABSTRACT

In the inter-city courier service provider, the vehicle starts from depot, visits a set of customers in order to collect customer’s packages, and finishes at one of the consolidation points. The problem is how to construct route of each vehicle in order to minimize total travel time. Then, this route construction problem is described as Dynamic Vehicle Routing Problem dengan Time Window (DVRPTW).

In this paper, we will develop a heuristics algorithm to solve Dynamic Vehicle Routing Problem with Time Window of inter-city courier. The algorithm is divided by two phase, static phase and dynamic phase. In static phase, we use ant colony system algorithm which have been modified, and in dynamic phase, we use insertion heuristics algorithm. Different from static vehicle routing problem with time windows, we dynamically build the vehicle routes due to real time information such as new customer requests, position of the vehicle, etc.

In order to measure the performance of algorithm, we coded the algorithms and conducted some numerical experiments based on standard test data of Chen. Then, we implemented teh algorithm on street network of Surabaya city. We also compare the algorithm with nearest neighbor dan nearest neighbor + node insertion. Finally, based on numerical experiment result, we make the conclusion that the algorithm can solve DVRPTW of inter-city and result the total travel time better than nearest neighbor and nearest neighbor + node insertion.

Keywords : Intercity Courier, Dynamic Vehicle Routing Problem dengan Time Window (DVRPTW), Ant Colony System, Insertion Heuristics, Dispatch.