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# Heuristic approach for robust counterpart open capacitated vehicle routing problem with time windows

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## Abstract

Garbage is one of the environmental problems. The process of transporting garbage sometimes occurs delays such as congestion and engine failure. Robust optimization model called a robust counterpart open capacitated vehicle routing problem (RCOCVRP) with time windows was formulated to get over this delays. This model has formulated with the limitation of vehicle capacity and time windows with an uncertainty of waste volume and travel time. The RCOCVRP model with time windows is solved by a heuristic approach. The heuristic approach used to solve the RCOCVRP model with time windows uses the nearest neighbor and the cheapest insertion heuristic algorithm. The RCOCVRP with time windows model is implemented on the problem of transporting waste in Sako sub-district. The solutions of these two heuristic approaches are compared and analyzed. The RCOCVRP model with time windows to optimize the route problems of waste transport vehicles that is solved using the cheapest insertion heuristics algorithm is more effective than the nearest neighbor method. © 2021 The Authors.

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