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A VRP-Based Route Planning for a Mobile Robot Group

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Abstract: In this study, a vehicle routing problem-based approach is presented to construct non-intersecting routes for the members of a mobile robot team. It is assumed that each robot starts from a central location such as the charging point, completes its route and returns to the starting location. The proposed method consists of three algorithms: a sweep algorithm determines the position of each node in clockwise (or counter clockwise) manner with respect to the starting location; savings algorithm calculates the saving obtained by adding a node to the route of a robot; Dijkstra's shortest path algorithm is used to calculate the shortest distance from any node to another one when the network is sparse. Simulations are performed using some benchmark VRP problems and results are compared with the optimal solution of the same problems. It is shown that our approach constructs routes significantly fast with near optimal energy consumption.

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