
A solution method for k-mldp and some comparatives.

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Abstract

We introduce a bi-objective problem which considers a fleet of k uncapacitated vehicles to visit a set of clients waiting for a service. In this problem we optimize an economic objective as well as a service-quality objective simultaneously by minimizing the total travel distance of the fleet while also minimizing the total waiting time of the clients to be visited. All agents depart from a known depot and return to it at the end of the day. Each of the clients is visited exactly once and all agents must be active.

This combination of objectives seeks to satisfy the requests of the clients as fast as possible by minimizing their total waiting time while the agents travel the minimum distance to perform the visiting. We call this problem as k -Minimum Latency-Distance Problem (k -MLDP), AND IN THIS TALK WE PRESENT A NOVEL HEURISTIC APPROACH TO APPROXIMATE ITS PARETO FRONTS. WE CALL THIS METHODOLOGY AS EVOLUTIONARY ALGORITHM WITH INTELLIGENT LOCAL SEARCH (EiLS). IT IS BASED ON THE CLASSICAL PARETO RANKING SCHEME WITH CROWDING DISTANCE, WHICH WAS ORIGINALLY PROPOSED BY DEB ET AL (2000) IN THEIR NSGA-II ALGORITHM, BUT TO PRODUCE OFFSPRINGS EiLS EMPLOYS AN EFFICIENT RANDOM-SHAKE CROSSOVER AND AN INTELLIGENT LOCAL SEARCH OVER VARIOUS NEIGHBORHOODS AS A SUBSTITUTE FOR A CLASSICAL MUTATION PROCESS. EiLS EXPLOITS k -MLDP STRUCTURE AND SELECTS THE NEIGHBORHOOD WITH THE BEST RATIO OF SUCCESS, TO MAINTAIN A HIGH QUALITY OF THE PRODUCED FRONTS. WE SHOW COMPARISONS BETWEEN A CLASSICAL MULTI-OBJECTIVE SOLUTION ALGORITHM AND EiLS.

Keywords: Multiple Traveling Salesman Problem, Multiple Traveling Repairman Problem, Bi-objective Optimization

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