Two-phase hybrid algorithm for the vehicle routing problem with scarce, reusable resources

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Abstract

This work presents a hybrid algorithm for the vehicle routing problem with scarce, reusable resources. The proposed methodology allows to decompose the problem in two phases. Firstly, a Mixed Integer Programming-based procedure is developed to provide multiple assignments for pickups and deliveries of a set of tools within a planning horizon. Secondly, a heuristic algorithm is put forward to obtain routes that satisfy the scheduled pickups and deliveries, relying on savings and local search procedures. The methodology is devised to address the VeRoLog Solver Challenge Part I (All-time-best). Results are validated on the challenge platform for the available instances, for which feasible solutions are consistently obtained within reasonable CPU times, achieving high ranking positions in the challenge.

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