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# A variable neighborhood search heuristic algorithm for production routing problems

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## Abstract

In a production routing problem (PRP), the aim is to integrate planning of production, inventory, delivery schedules and vehicle routes in supply chains. In this work, we present a variable neighborhood search metaheuristic for the PRP. In the metaheuristic, variables of delivery and routing decisions are handled by local search based on skewed general variable neighborhood search and guided variable neighborhood descent, respectively. Binary variables for production setups and continuous variables for production quantities and the depot inventory are determined in a production-inventory subproblem with a mixed integer programming solver. The computational results show that the proposed heuristic is competitive with the state-of-the-art algorithms on the benchmark instances. Furthermore, the proposed heuristic outperforms existing heuristics on the standard and high transportation cost benchmark instances in Archetti et al. (2011) and large size benchmark instances in Boudia et al. (2007) within comparable computing times.

*Keywords:* Routing; Production Planning; Guided Variable Neighborhood Descent; Skewed General Variable Neighborhood Search

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