

Renault’s Forward Logistic Problem

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Keywords: Network design, multicommodity flow, large scale combinatorial optimization

The inbound supply chain of a carmaker is designed to transport tens of thousands of types of car parts from thousands of suppliers to dozens of plants. This logistics operation represents tens of millions of euros and tens of thousands of tons of CO2 emissions per year. The arrival of a new vehicle in the catalog of a carmaker requires a redesign of the network. The resulting problem is a rich version of a multicommodity network design problem [1]. Its difficulty stems from the combination of a large network and a huge number of commodities to be routed, nearly a million. The considered problem is therefore orders of magnitude bigger than what usual resolution methods from the literature can solve [2, 3, 4]. We model a simplified version of this network design problem and propose a heuristic algorithm to solve it in reasonable time. We provide a data analysis of their instance and a lower bound to analyze algorithm performance. Numerical experiments show significant improvement over Renault’s current solution but also point to a large margin of possible improvement. We finally conclude on the future research perspectives arising from the insights collected in this work.

References

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