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Scheduled Service Network Design with Synchronization and Transshipment Constraints for Intermodal Container Transportation Networks

Abstract

In this presentation we address the problem of scheduled service network design for container distribution over port's hinterland. We propose a new concise continuous-time mixed-integer linear programming model that accurately evaluates the time of occurrence of transportation events and the number of containers transshipped between vehicles. Given the transportation network, the fleet of available vehicles, the demand and the supply of containers, the sailing time of vehicles, and the structure of costs, the objective of the model is to build a minimum cost service network design and container distribution plan that defines services, their departure and arrival times, container routing. The model is solved with an existing solver and is tested on data instances inspired from real-world problems encountered by EU carrier companies. The results of our computational study show that in scheduled service networks direct routes happen more often when either the fleet capacity is tight or the handling costs or the lead time interval increases. On contrary, the increase of the same parameters leads to the decrease of the number of containers transshipped between vehicles.

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