A comparison of two exact methods for passenger railway rolling stock (re)scheduling - DTU Orbit (13/12/2018)

A comparison of two exact methods for passenger railway rolling stock (re)scheduling

The assignment of rolling stock units to timetable services in passenger railways is an important optimization problem that has been addressed by many papers in different forms. Solution approaches have been proposed for different planning phases: strategic, tactical, operational, and real-time planning. In this paper we compare two approaches within the operational and real-time planning phase. The first exact approach is based on a known Mixed Integer Linear Program (MILP) which is solved using CPLEX. The second approach is a new method that is an extension of a recently introduced MILP, which is solved using a column and row generation approach. In this paper, we benchmark the performance of the methods on networks of two countries (Denmark and The Netherlands). We use the approaches to make daily schedules and we test their real time applicability by performing tests with different disruption scenarios. The computational experiments demonstrate that both models can be used on both networks and are able to find optimal rolling stock circulations in the different planning phases. Furthermore, the results show that both approaches are sufficiently fast to be used in a real-time setting.

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