

A Matheuristic Approach to Integrate Humping and Pullout Sequencing Operations at Railroad Hump Yards - DTU Orbit (08/11/2017)

A Matheuristic Approach to Integrate Humping and Pullout Sequencing Operations at Railroad Hump Yards

This article presents a novel matheuristic for solving the hump yard block-to-track assignment problem. This is an important problem arising in the railway freight industry and involves scheduling the transitions of a set of rail cars from a set of inbound trains to a set of outbound trains over a certain planning horizon. It was also the topic of the 2014 challenge organized by the Railway Applications Section of the Institute for Operations Research and the Management Sciences for which the proposed matheuristic was awarded first prize. Our approach decomposes the problem into three highly dependent subproblems. Optimization-based strategies are adopted for two of these, while the third is solved using a greedy heuristic. We demonstrate the efficiency of the complete framework on the official datasets, where solutions within 4–14% of a known lower bound (to a relaxed problem) are found. We further show that improvements of around 8% can be achieved if outbound trains are allowed to be delayed by up to 2 h in the hope of ensuring an earlier connection for some of the rail cars. © 2015 Wiley Periodicals, Inc.

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