
Local search for the container relocation problem

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Abstract

The unrestricted block relocation problem is an important optimization problem encountered at terminals, where containers are stored in stacks. It consists in determining the minimum number of container moves so as to empty the considered bay following a certain retrieval sequence. A container move can be either the retrieval of a container or the relocation of a certain container on top of a stack to another stack. The latter types of moves are necessary so as to provide access to containers which are currently not on top of a stack. They might also be useful to prepare future removals. In this paper, we propose the first local search type improvement heuristic for the block relocation problem. It relies on a clever definition of the state space which is explored by means of a dynamic programming algorithm so as to identify the locally optimal sequence of moves of a given container. Our results on large benchmark instance reveal unexpectedly high improvement potentials (up to 50%) compared to results obtained by state-of-the-art constructive heuristics.

Keywords: container relocation, dynamic programming, local search, shortest path

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