

2019

A Branch-and-Cut Algorithm for the Multi-Compartment Vehicle Routing Problem with Flexible Compartment Sizes.

This page contains material of the following publication:

Henke, T.; Speranza, M.G.; Wäscher, G. (2019):


A Branch-and-Cut Algorithm for the Multi-Compartment Vehicle Routing Problem with Flexible Compartment Sizes.

In: *Annals of Operations Research* 275, 321-338.

Abstract:

Multi-compartment vehicle routing problems arise in a variety of problem settings in which different product types have to be transported separated from each other. In this paper, a problem variant which occurs in the context of glass waste recycling is considered. In this problem, a set of locations exists, each of which offering a number of containers for the collection of different types of glass waste (e.g. colorless, green, brown glass). In order to pick up the contents from the containers, a fleet of homogeneous disposal vehicles is available. Individually for each disposal vehicle, the capacity can be discretely separated into limited number of compartments to which different glass waste types are assigned. The objective of the problem is to minimize the total distance to be travelled by the disposal vehicles.

For solving this problem to optimality, a branch-and-cut algorithm has been developed and implemented. Extensive numerical experiments have been conducted in order to evaluate the algorithm and to gain insights into the problem structure. The corresponding results show that the algorithm is able to solve instances with up to 50 locations to optimality and that it reduces the computing time by 87% compared to instances from the literature. Additional experiments give managerial insights into the use of different variants of compartments with flexible sizes.

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	› Data files	This file contains all data files and a format description. (Update 17-08-2022: Small conversion mistakes have been corrected.)

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- ▶ 2019
- ▶ 2017 / III.
- ▶ 2017 / II.
- ▶ 2017 / I.
- ▶ 2016 / III.
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- ▶ 2016 / I.
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- ▶ 2015 / III.
- ▶ 2015 / II.
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- ▶ 2014
- ▶ 2012 / II.
- ▶ 2012 / I.
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- ▶ 2007 / II.
- ▶ 2007 / I.
- ▶ 2004 / I.
- ▶ 2003 / I.