Optimizing routes with service time window constraints

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2019

document version
Publisher's PDF, also known as Version of record

Link to publication in VU Research Portal

citation for published version (APA)
Hoogeboom, M. (2019). *Optimizing routes with service time window constraints.*

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OPTIMIZING ROUTES
WITH SERVICE TIME
WINDOW CONSTRAINTS

Logistics companies struggle to keep up with increasing customer service levels and pressure to become more cost-efficient. Customers typically prefer narrow service time windows and want to indicate when they are available for service. Therefore, in almost all practical distribution settings, constraints on service time windows have to be taken into account in formulating and solving routing problems. This thesis proposes efficient routing and scheduling methods to handle various service time window constraints when calculating cost-efficient solutions. Three routing problems are studied in which service time windows play an important role. First, a routing problem is considered in which customers can indicate multiple time windows in which they are available for service. Secondly, inspired by security considerations in cash transport, a routing problem is solved in which the arrival times at the customers should be unpredictable. Thirdly, a method is developed to simultaneously assign small time windows to customers and to determine a routing solution, taking uncertainty in travel and service times into account. To solve these problems, heuristic, exact, and robust solutions methods are proposed.

About the author

Maaike Hoogeboom (1991) obtained her BSc (2012) and MSc (2014) degrees in Mathematical Sciences at Utrecht University. In 2014, she started her PhD at the School of Business and Economics at the Vrije Universiteit Amsterdam. During her PhD, she did a research visit at Massachusetts Institute of Technology. Since February 2019, Maaike works as a data scientist at Achmea.

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