Aalto-yliopisto
Perustieteiden
korkeakoulu

A formulation for the Truck and Trailer Vehicle Routing Problem

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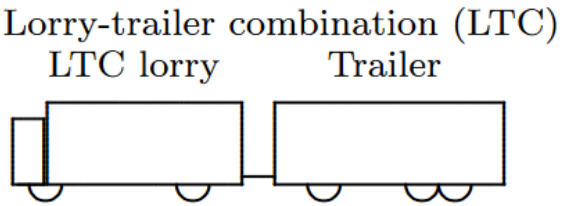
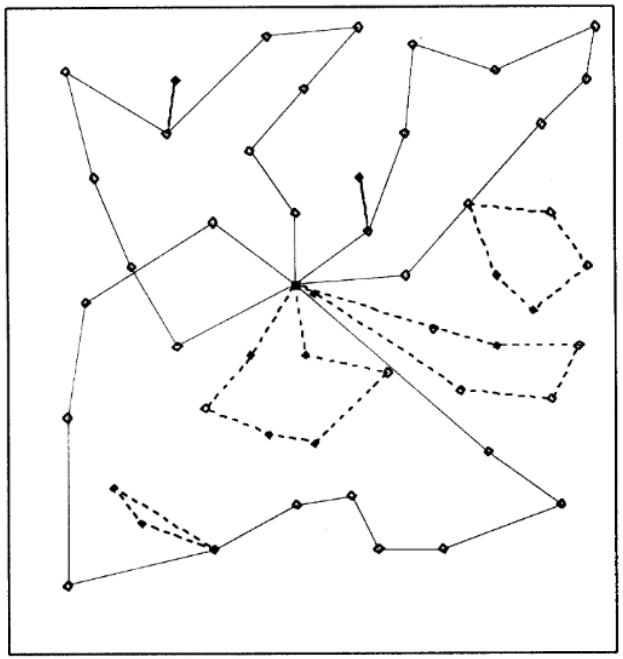
Systeemianalyysin
laboratorio

Truck and Trailer Routing Problem (TTRP)

- Extension of the Vehicle Routing Problem
- A fleet of trucks and trailers services a set of customers
- Some customers cannot be serviced by a full vehicle
- Trailers can be detached and left to wait while serving these customers



Drexl 2011



Chao 2002

Truck and Trailer Routing Problem (TTRP)

- The TTRP has applications in logistics and distribution management in cases where some locations are inaccessible for complete vehicles (e.g., milk collection from farms, food distribution to markets)
- NP-hard
- Has many generalizations such as use of time windows, heterogenous fleets and transshipment locations
- Most of the available literature focuses on heuristics

Objective

- Study existing literature on TTRP and related problems
- Formulate the TTRP as an optimization problem
- Implement the formulation using a mathematical programming solver to get exact optimal solutions
- Perform computational experiments

Methods and tools

- Mixed-Integer Linear Programming
- IBM ILOG CPLEX
- C++

Timetable

- Previously: Problem formulation, computational experiments
- 10/2019: This presentation
- 10-12/2019: Writing
- 2019-2020: Final presentation

References

- I Chao et al. A tabu search method for the truck and trailer routing problem. Computers & Operations Research, 29(1):33-51, 2002.
- Michael Drexl. Branch-and-price and heuristic column generation for the generalized truck-and-trailer routing problem. Revista de Métodos Cuantitativos para la Economía y la Empresa, 12:5-38, 2011.
- Frédéric Semet and Eric Taillard. Solving real-life vehicle routing problems efficiently using tabu search. Annals of Operations research, 41(4):469-488, 1993.