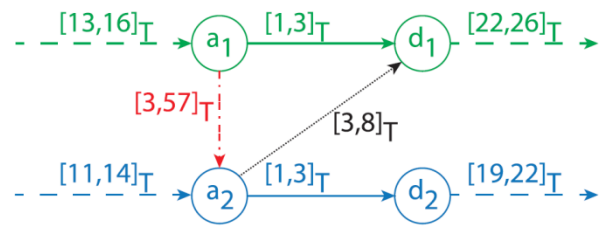


Solving large-scale periodic timetabling problems



Problem description

Timetabling is one of the most crucial planning problems. The constant growth of railway transport demand on one hand, and the limited existing infrastructure capacity on the other forces the railways to constantly enhance their processes to improve performance in managing existing and planned resources. Mathematical models significantly contribute to better and more efficient planning of services and operations. In the Netherlands, the planning tool DONS has been developed and used for designing timetables since 2007. Currently, due to an increased number of operating trains and problem complexity, DONS is no more used and new approaches for generating new timetables are needed.

Possible assignment

This project offers multiple scientific and practical directions that could be investigated individually or combined such as new mathematical models and approaches, robust and resilient timetabling, explorations of periodic event scheduling problem and its extensions, network decompositions, integrated approaches, heuristics.

Expected research steps are:

- Literature study of existing articles
- Data preparation
- Develop a new approach for designing timetables
- Experimental study
- Write a report and a scientific paper

Background

A student is expected to have knowledge and interest in mathematical optimization, data analysis, and programming. The project builds on recent developments of the Digital Rail Traffic Lab with NS and ProRail. It can be conducted as final thesis project or research project. The research can be preformed within T&P and/or in collaboration with a relevant railway company.

Information

Digital Rail Traffic Lab (DRTLlab) www.tudelft.nl/drtlab/

Thesis supervision: Prof. dr. Rob Goverde, Dr. Nikola Bešinović

Contact: n.besinovic@tudelft.nl