Flexible event times in Periodic Event Scheduling Problem

Problem description

Scheduling trains in periodic timetables is increasingly demanding because of the ever-growing passenger demands on the one hand and the capacity restrictions and the timetable robustness on the other hand. On a macroscopic level, each departure or arrival of a train at a station which takes place at a certain time is called an event. Instead of exact event times, additional flexibility for these events can be introduced to create more chances for finding a feasible train routing on the microscopic level. However, little is known for which events this flexibility can be defined and to what extent. Thus, the research question arises: How can we define a periodic event scheduling problem with flexible event times?

Assignment

- Examine current literature relevant to the periodic event scheduling problem.
- Develop a mathematical optimization model for adding event flexibility to the existing periodic event scheduling problem in the literature.
- Evaluate the timetable performance with the added flexibility.
- Write an MSc thesis report.

Background

A student is expected to have interest and knowledge in railway timetabling, train operation and optimization as provided in CIE5826 Railway Operations and Control and CIE5803 Railway Traffic Management. They will have an opportunity to further develop skills in railway timetabling as well as mathematical modelling. The research can be performed within T&P.

Reference

G. Caimi et al., Periodic railway timetabling with event flexibility. *Networks*, 57: 3-18, 2011.
Z. Wang et al., Conflict-free train path planning using ATO timing points. Pre-print, 2022.

Information

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