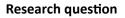| Scientific head:	Prof. Dr. F. Corman
Project title:	Transferring timetable optimisation tools from research to practice – Service Frequency Increase at SZU
Supervision:	Jan Lordieck
Tech Support	Florian Fuchs

Background

Today, railway operations are planned manually, with only supporting software tools. The support is limited to calculating running times, storing data, and simplifying hand-designed timetables. Advanced tools offer conflict detection and automatic track selection in stations for some situations. In research, instead, algorithmically planning railway operations is prevalent.

Problem description

The transfer of methods developed in science for planning railway operations is still uncommon, although the literature shows that the potential is enormous.

Research question

This proposal intends to explore how tools from research can be used in the planning of railways on a strategic horizon. The SZU railway network should increase the service frequency of its two lines on some sections to 7.5 minutes during the day in 2035. While necessary infrastructure measures are roughly defined, the timetable is not yet defined. The task is to apply timetable optimisation tools to identify a robust timetable for the operation, thereby placing the limitations of applying algorithmic planning to a real-world case.

Expected results

The student taking this challenge is expected to plan a robust timetable for the envisaged operation of SZU and answer the research questions of why algorithmic planning is not yet incorporated into planning practice, what its current limitations are, and how they could be overcome. IVT provides the toolbox for algorithmic timetabling; however, adjustments might be necessary.

Credits:	20-30 (Master Thesis)
Requirements:	• Motivation to work with a real-world example • Some experience in optimisation to apply and adjust existing problems and algorithms for a real-world application • Some experience with programming in Python