“Development of a macroscopic simulation model for capacity and delay analysis in railway networks“

The task of this thesis is to develop, a simplified generic model of a railway network that allows studying correlations between network topology, the overall capacity and the propagation of delays.

First, the fundamentals of railway operations research in relation to capacity and delays must be described. Afterwards, a suitable simulation model should be implemented using an adequate programming language. This includes the macroscopic modelling of railway infrastructure and timetables. In a first step the overall capacity of the network has to be investigated. Subsequently, adequate rules for the injection of delays and simple dispatching rules must be established.

Based on this model, a systematic study on the effects of different network sizes as well as different topological features of the networks on the overall capacity and on the occurrence and propagation of delays will be conducted. The simulation results shall be analysed quantitatively, using suitable statistical measures and critically discussed with respect to their implications for the robustness of railway network structures.