1908. Track discretisation in railway traffic rescheduling models for next-generation distance-to-go signalling

Authors

1. **Nina Versluis**
   Delft University of Technology
2. **Paola Pellegrini**
   Université Gustave Eiffel
3. **Egidio Quaglietta**
   Delft University of Technology
4. **Rob Goverde**
   Transport and Planning, Delft University of Technology
5. **Joaquin Rodriguez**
   Cosys-Estas, University Gustave Elffel

Abstract

In case of disturbed railway operations, traffic management can apply rescheduling measures to resolve conflicts while minimising delay propagation. This can be optimised by conflict detection and resolution (CDR) models. Usually based on alternative graph or mixed integer linear programming (MILP) formulations, existing models mostly refer to conventional signalling systems in which the track is discretised into blocks. Only at block entries, trains can receive a brake indication. Hence, train separation distances are based on a number of blocks. With the implementation of continuous braking curve supervision in distance-to-go (DTG) signalling systems such as the European Train Control System (ETCS), train separation is based on absolute braking distances. Consequently, an explicit relation between speed and train separation is required in CDR models for DTG signalling. Recently, we enhanced the CDR model RECIFE-MILP to DTG operations. The enhancements relate to track discretisation and speed-dependent train separation. In this research, we investigate the effect of track discretisation granularity on the performance of the enhanced model for next-generation DTG signalling systems: ETCS Level 3 Fixed Virtual Block and Moving Block. The performance is assessed regarding total delay and rescheduling decisions. The results indicate that, depending on the track and traffic scenario, a finer granularity can lead to different rescheduling decisions due to shorter train separation.

Keywords

- Railway Applications
- Programming, Mixed-Integer
- Decision Support Systems