REAL-TIME RAILWAY TRAFFIC MANAGEMENT THROUGH OPTIMISATION TOOLS

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Résumé

Railway operations management must cope with failures of the railway system and with external disturbances that may cause initial delays, the so-called primary delays. In heavy traffic areas of railway networks, primary delays can quickly lead to many further delays, called secondary delays or knock-on delays. This paper describes the results of an experimental analysis which aims to evaluate the ability of railway traffic optimization tools to decrease secondary delays, by selecting appropriate route settings and sequences of train movements.

We have previously proposed a mixed-integer linear programming (MILP) formulation to tackle this problem (Pellegrini, P., Marlière, G. and Rodriguez, J. 2013. Optimal train routing and scheduling for managing traffic perturbations in complex junctions, Transportation Research Part B: Methodological, to appear). This formulation considers a fine granularity of the infrastructure and it takes into account a large number of commercial and technical aspects characterizing real situations, e.g., passenger and rolling stock connections between trains, signal watching times, different numbers of signaling aspects, sectional route release of the interlocking systems.

The experiments reported in this paper have been carried out in the context of the ON-TIME European project (http://www.ontime-project.eu/). This project aims to develop a prototype for a new generation of railway traffic management systems which will increase capacity and decrease delays, for augmenting customers' satisfaction. The results of the project will be validated through system simulation and real-life case studies proposed by different railway undertakings partners of the project.

Mots-Clés: real, time railway traffic management, mixed, integer linear programming, simulation, routing, scheduling

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