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Optimizing the simplon railway corridor. (English) Zbl 1301.90028
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Summary: This paper presents a case study of a *railway timetable optimization* for the very dense *Simplon corridor*, a major railway connection in the Alps between Switzerland and Italy. The key to deal with the complexity of this scenario is the use of a novel aggregation-disaggregation method. Starting from a detailed *microscopic representation* as it is used in railway simulation, the data is transformed by an automatic procedure into a less detailed *macroscopic representation*, that is sufficient for the purpose of capacity planning and amenable to state-of-the-art integer programming optimization methods. This macroscopic railway network is saturated with trains. Finally, the optimized timetable is re-transformed to the microscopic level in such a way that it can be operated without any conflicts among the train paths. Using this micro-macro aggregation-disaggregation approach in combination with integer programming methods, it becomes for the first time possible to generate a profit maximal and conflict free timetable for the complete Simplon corridor over an entire day by a simultaneous optimization of all trains requests. In addition, this also allows us to undertake a sensitivity analysis of various problem parameters.

MSC:

[90B35](#) Deterministic scheduling theory in operations research
[90B06](#) Transportation, logistics and supply chain management
[90C10](#) Integer programming

Cited in **2** Documents

Keywords:

[railway track allocation](#); [network aggregation](#); [case study](#); [simplon corridor](#)

Software:

[TTPLib](#)

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