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*Method of reconfiguring the planned timetable taking into account the robustness of the rail transport system*

The growing interest in rail transportation and the increasing frequency of trains are causing an increase in adverse events and train delays. A survey of the state of knowledge revealed a lack of methods for assessing the robustness of rail transportation systems that take into account all the parameters identified in the literature recognition.

Indicators quantifying the robustness of train timetables, which have not been systematically taken into account so far, have been identified. Using these, a method for reconfiguring the planned timetable taking into account the robustness of the rail transportation system to disruptions was developed. The method makes it possible to evaluate the planned timetable and make changes to it in accordance with the developed algorithms. It was verified on a real railroad section mapped in a simulation program and allowed to improve the index of robustness to disturbances.

The method uses: developed real data on adverse events assigned to individual elements of the simulation model in the form of probability density distributions, constraints related to the construction of the railroad timetable, synthetic indicators of robustness related to: the proportion of on-time trains, travel time extension, train delay at stations, related activities and station delay. The developed method consists of: an algorithm for building a train base, an algorithm for damage generation, an algorithm for simulation with disturbances, algorithms for calculating indicators of timetable robustness to disturbances, and an algorithm for making changes to the timetable.

The method is universal and can be used to evaluate and make changes to the timetables of different rail carriers, under different operational and infrastructure conditions due to the possibility of introducing its own parameters.

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