

Monetary Evaluation of Dispatching Decisions in Consideration of Choice of Transport

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Abstract : Microscopic simulation programs enable the description of the two processes of railway operation and the previous timetabling. Occupation conflicts are often solved based on defined train priorities on both process levels. These conflict resolutions produce knock-on delays for the involved trains. The sum of knock-on delays is commonly used to evaluate the quality of railway operations. It is either compared to an acceptable level-of-service or the delays are evaluated economically by linearly monetary functions. It is impossible to properly evaluate dispatching decisions without a well-founded objective function. This paper presents a new approach for evaluation of dispatching decisions. It uses models of choice of transport and considers the behaviour of the end-costumers. These models evaluate the knock-on delays in more detail than linearly monetary functions and consider other competing modes of transport. The new approach pursues the coupling of a microscopic model of railway operation with the macroscopic model of choice of transport. First it will be implemented for the railway operations process, but it can also be used for timetabling. The evaluation considers the possibility to change over to other transport modes by the end-costumers. The new approach first looks at the rail-mounted and road transport, but it can also be extended to air transport. The split of the end-costumers is described by the modal-split. The reactions by the end-costumers have an effect on the revenues of the railway undertakings. Various travel purposes has different pavement reserves and tolerances towards delays. Longer journey times affect besides revenue changes also additional costs. The costs depend either on time or track and arise from circulation of workers and vehicles. Only the variable values are summarised in the contribution margin, which is the base for the monetary evaluation of the delays. The contribution margin is calculated for different resolution decisions of the same conflict. The conflict resolution is improved until the monetary loss becomes minimised. The iterative process therefore determines an optimum conflict resolution by observing the change of the contribution margin. Furthermore, a monetary value of each dispatching decision can also be determined.

Keywords : choice of transport, knock-on delays, monetary evaluation, railway operations

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