On the Problem of Sorting Railway Freight Cars : An Algorithmic Perspective

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Cuvillier Verlag Nov 2011, 2011. Taschenbuch. Condition: Neu. Neuware - In this thesis the algorithmic foundations of a particular sorting problem from railway optimization are studied. The addressed problem is called train classification, and it refers to the fundamental procedure of rearranging the cars of several trains into other compositions of different orders comprising new trains. The train classification methods applied today present rather conservative approaches, and there is a lot of room for systematic improvement by applying optimization methods.The sorting processes are performed according to plans prepared in advance called classification schedules. They are conducted in specific railway facilities called classification yards. Without expensive redesigns of existing classification yards, the dwell time of railway cars can be reduced by accelerating the core classification process itself. To this aim, the combinatorial structure of the sorting processes are studied in this thesis in order to provide algorithmic solutions for the abstract problems derived from the practical setting with formal proofs of their efficiency. Conversely, the gained insights are applied to real-world problem instances to show that the theoretical approaches work in practice and improve on the methods applied today.First of all, a novel encoding of classification schedules is presented. This does...

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