

## **A decomposition approach for integrated locomotive scheduling and driver rostering in rail freight transport**

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In this work, we consider the integrated problem of locomotive scheduling and driver rostering in rail freight companies. Our aim is to compute an optimal simultaneous assignment of locomotives and drivers to the trains listed in a given order book. We develop a binary-programming formulation to model the given task and present ways to improve it. We then introduce a novel decomposition approach which decomposes the problem into a master locomotive scheduling problem and a subproblem for driver rostering. For any fixed solution of the master problem, we can use the subproblem to either confirm feasibility of the master solution or to derive valid inequalities from various constraint classes and reiterate. To further improve solution times, we also develop a presolve heuristic. We demonstrate the potential of our method by solving a large-scale real-world problem instance provided by our industry partner DB Cargo Polska S.A.