Summary of the Thesis

Optimization models for a tire curing scheduling problem

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The main topic of this thesis is solving a tire-curing optimization problem, which is a widely discussed problem due to its capital-intensive nature. For our numerical tests, we were provided real life monthly production data of a tire factory.

In the first half of the thesis, we describe a Mixed Integer Linear Programming model for the problem, which appeared to be challenging even for commercial MILP solvers. The solver had to run for several hours just to find a feasible solution with integer values, and the solutions obtained even after additional runtime were not close to the provided ideal values for the daily number of conversions and the daily number of used green tire types. One way to address this issue is to develop a heuristic that generates a feasible initial solution, which can then be provided to the solver to accelerate the branch-and-bound process.

In the second half, we introduce a constructive heuristic that generates a feasible initial solution. The numerical tests show that an initial solution can be obtained from the implemented code in less than 10 seconds on average for all problem instances. Using this initial solution and sequantial optimization, the solver can find a solution that meets the given requirements regarding the production plan in less than one and a half hour.

The heuristic performs well in its current form for most cases, but it could be further adapted for more general datasets as part of future research.