

Master Thesis Proposal

Integrated Models in the Airline Scheduling Process

Due to its complexity, the airline scheduling process is separated into four sequential steps of schedule design, aircraft assignment, maintenance routing and crew scheduling. These problems are solved sequentially and each former problem's output serves as input for the following problem. While some of these steps do have different planning scales such as all aircraft fleets vs. only a single fleet; a complete integration is possible to model but not to solve with the currently available methods for realistic instances. To come closer to this ideal state of the process, some models have been integrating one or even more scheduling steps.

The objectives of this thesis are to...

- introduce the Airline Scheduling Process and its sequential steps,
- summarize the literature of models covering multiple steps,
- discuss and / or improve one model in detail,
- implement an academical example in Ampl or a similar programming language,
- provide open research gaps and future trends.

Basic Literature:

Belobaba, P., Odoni, A., & Barnhart, C. (Eds.). (2015). *The global airline industry*. John Wiley & Sons.

Sandhu, R., & Klabjan, D. (2007). Integrated airline fleet and crew-pairing decisions. *Operations Research*, 55(3), 439-456.

Shao, S., Sherali, H. D., & Haouari, M. (2017). A novel model and decomposition approach for the integrated airline fleet assignment, aircraft routing, and crew pairing problem. *Transportation Science*, 51(1), 233-249.