TUM School of Management

Technische Universität München

At the **Chair of Operations Management** at **TUM School of Management**, we are looking for interested and qualified students to conduct their

Master's Thesis

on the following topic:

Comparison of Airline Scheduling Algorithms in the Context of Aircraft Sharing

This thesis considers the introduction of an aircraft sharing concept. By redefining traditional ownership and operational relationships among airlines and aircraft leasing companies, this innovative approach allows multiple providers to access a shared aircraft fleet. As a result, the existing flight network can be redesigned, which may lead to a significant reduction in emissions in the aviation sector. One important step in this reorganization of the flight network is the creation of a new flight schedule. Given a set of airports as well as for each pair of airports the number of weekly flights to be performed for each aircraft type, the planning task is to determine the optimal departure times for all flights within a weekly schedule. Various capacity and operational constraints need to be taken into account. The objective is to make best use of the available aircraft fleet.

Your tasks:

- Perform a literature review on existing approaches for the problem (and/or similar problems)
- Based on the results of your review and existing work provided by us, implement at least two methods to solve the problem efficiently.
- Using test data provided by us, solve the problem using the methods you have implemented, and compare their performance

Requirements:

- Profound knowledge in mathematical optimization
- Familiarity with commercial solvers (Gurobi, CPLEX, or similar)
- Programming experience (preferably Python)
- Affinity to aviation is a plus

Beginning date: as soon as possible

Main supervisor: Prof. Dr. Rainer Kolisch (rainer.kolisch@tum.de)

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