

Master Thesis:

Modelling stochastic trajectory deviations between planned and actual trajectories in the European Air Transportation System

Task Description:

The European airspace is one of the most congested airspaces in the world. Subsequently, there is ongoing research about optimal utilization of airspace capacity. However, management of air traffic is complicated by imprecise prediction of aircraft positions. Due to numerous influences, like wind and weather, actual trajectories deviate from planned trajectories in space and time. In this work, probabilistic methods shall be used to quantify geometric and temporal deviations of European flights. Planned and actual trajectories are provided by the research model for the European airspace, the Network Flow Environment (NFE), which is developed at the Institute of Air Transportation Systems. The improved flight predictions should allow a more accurate prediction of capacity demand. Following tasks will be worked on:

- Becoming acquainted with flight planning and the management of trajectories
- Literature research about trajectory deviations
- Identification of most important measurements
- Computation of e.g. probability mass functions
- Studies on large datasets of European traffic
- Discussion and documentation

Requirements:

- Studies in Engineering / Data Science / Applied Mathematics / Quantitative Economics / Etc.
- Motivation and ability to work independently and collaboratively
- High working knowledge of English or German
- Proficiency in Statistics and Stochastic
- Good programming skills (preferably Matlab or Python)
- Accurate and reliable working style

Begin and duration:

From now on, for approximately 6 months

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