

The Air Traffic Flow Management Problem with Interdependent Flight Schedules

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Abstract— This paper extends the Balakrishnan and Chandran’s trajectory-based optimization model for large-scale air traffic flow management problems (ATFM) to account for connecting flights. This paper then proposes a nested column generation approach to solve the ATFM problem, determining the optimal space-time trajectories and airline (group) decisions in the presence of network and flight connectivity constraints, as well as airspace and airport surface capacity constraints. The algorithm is scalable as it is parallel, and has been tested on a large-scale instance using scheduled flight data for the ASEAN region, showing that it is capable of solving realistic-sized problems with thousands of flights.