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Quantum Annealing for Air Traffic Management

In addition to studying fundamental properties of quantum annealing, it is imperative to find possible real world application for this technology. We studied quantum annealing for the real-world planning problem of deconflicting wind-optimal trajectories from air traffic management (ATM) [1]. From real-world data, we extracted subproblems which we mapped to QUBO. We were able to embed small problem instances into the D-Wave quantum annealer's chimera architecture and solve them. We report on how the embeddability and solution quality depend on the temporal coarseness and configuration space restrictions used when mapping the ATM problem to QUBO, using both classical solvers and quantum annealing runs.

[1] Olga Rodionova et. al. Deconflicting Wind-Optimal Aircraft Trajectories in North Atlantic Oceanic Airspace. AEGATS ‘16, Paris, France.