

## **An integer programming formulation to allocate series of slots on an airport network**

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Several authors have introduced mathematical formulations for the airport slot allocation process, and the initial allocation in particular. They mostly replicate the current IATA process, performed on an airport-by-airport basis. However, airports are part of a network. The initial slot allocation should therefore be performed simultaneously at all airports, accounting for flight times to link departures and arrivals. Pellegrini et al. (2017) propose an integer programming formulation to allocate a set of single-day slots on a network of airports. Extending that formulation, this paper additionally models the IATA rule stating that series rather than individual slots are to be allocated. A series of slots includes at least 5 slots at the same time and day-of-the-week, distributed regularly in a season. The objective of the allocation is to minimise airline costs due to the non-allocation of series of slots, their temporal displacement, and the deviation from the requested block or turnaround time for slots of coupled series. Preliminary experiments are based on a network of 152 European airports and consider about 300000 slot requests for seven Fridays of the 2017 summer season. Results quantify the increase of airline costs as a function of congestion.

Pellegrini P, Bolić T, Castelli L, Pesenti R, 2017. SOSTA: An effective model for the simultaneous optimisation of airport slot allocation. *Transportation Research Part E: Logistics and Transportation Review* 99:34–53