Incentives in landing slot problems

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Abstract

We analyze three applied incentive compatibility conditions within a class of queueing problems motivated by the reassignment of flights to airport landing slots. A preexisting landing schedule becomes wasteful when airlines privately learn updates about their flights cancelations or feasible flight times. The FAAs objective is to create a new queue that does not waste landing slots. We separately consider the airlines incentives to report their flights (IC1) feasible arrival times, (IC2) delay costs, or (IC3) cancelations. Our first three results show that any Pareto efficient rescheduling rule must be manipulable by each of these three methods separately. By weakening efficiency to a form currently achieved by the FAA, we recover incentive compatibility with respect to (IC2) and (IC3) by extending the Deferred Acceptance (DA) algorithm, while the FAAs current mechanism fails (IC3). Our extension is consistent with the FAAs information infrastructure, which does not elicit delay cost information. We show that essentially any such rule must fail (IC1), but that our extension satisfies a weak version of (IC1). Our model can be viewed as a one-sided version of the GaleShapley College Admissions model where only college preferences are relevant. This is a restricted counterpart to the School Choice model (Abdulkadiroğlu and Sönmez (2003)) in which only student preferences are relevant.

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