

Truthful Matching with Online Items and Offline Agents

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Abstract: We study truthful mechanisms for welfare maximization in online bipartite matching. In our (multi-parameter) setting, every buyer is associated with a (possibly private) desired set of items, and has a private value for being assigned an item in her desired set. Unlike most online matching settings, where agents arrive online, in our setting the items arrive online in an adversarial order while the buyers are present for the entire duration of the process. This poses a significant challenge to the design of truthful mechanisms, due to the ability of buyers to strategize over future rounds.

We provide an almost full picture of the competitive ratios in different scenarios, including myopic vs. non-myopic agents, tardy vs. prompt payments, and private vs. public desired sets.

Among other results, we identify the frontier for which the celebrated $e/(e - 1)$ competitive ratio for the vertex-weighted online matching of Karp, Vazirani and Vazirani extends to truthful agents and online items.

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