

The Stable Roommates problem with short lists *

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We consider two variants of the classical Stable Roommates problem with Incomplete (but strictly ordered) preference lists SRI that are degree constrained, i.e., preference lists are of bounded length. The first variant, EGAL d-SRI, involves finding an egalitarian stable matching in solvable instances of SRI with preference lists of length at most d . We show that this problem is NP-hard even if $d=3$. On the positive side we give a $(2d+3)/7$ -approximation algorithm for $d=3,4,5$ which improves on the known bound of 2 for the unbounded preference list case. In the second variant of SRI, called d-SRTI, preference lists can include ties and are of length at most d . We show that the problem of deciding whether an instance of d-SRTI admits a stable matching is NP-complete even if $d=3$. We also consider the "most stable" version of this problem and prove a strong inapproximability bound for the $d=3$ case. However for $d=2$ we show that the latter problem can be solved in polynomial time.

*<http://arxiv.org/abs/1605.04609>