An improved bound for the List Colouring Conjecture

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Abstract

The List Colouring Conjecture posits that the list edge chromatic number of any graph is equal to the edge chromatic number, and thus is at most $D+1$ where $D$ is the maximum degree. This means that if each edge is assigned a list of $D+1$ colours then it is always possible to obtain a proper edge colouring by choosing one colour from each list.

In the 1990’s, Khan proved that one can always obtain a proper edge colouring from lists of size $D + o(D)$, then Molloy and Reed obtained $D + D^{1/2}\text{poly}(\log D)$. We improve that bound to $D + D^{2/5}\text{poly}(\log D)$.