LOCAL COMPUTATION ALGORITHMS FOR COLORING OF UNIFORM HYPERGRAPHS

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Abstract. We investigate local computation algorithms (LCA) for two-coloring of k-uniform hypergraphs. We focus on hypergraph instances that satisfy strengthened assumption of the Lovász Local Lemma of the form $2^{1-\alpha k}(\Delta+1)\mathrm{e}<1$, where Δ is the bound on the maximum edge degree. The main question which arises here is for how large α there exists a LCA that is able to properly color such hypergraphs in polylogarithmic time per query. We describe briefly how upgrading the classical sequential procedure of Beck from 1991 with Moser and Tardos' RESAMPLE yields polylogarithmic LCA that works for α up to $1/4$. Then, we present an improved procedure that solves wider range of instances by allowing α up to $1/3$.

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