

Avoiding tight twins in sequences

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Abstract

A subsequence $(a_i, a_{i+1}, \dots, a_{i+2k-1})$ of a sequence (a_n) is called a tight twin if it can be split into two identical subsequences, ie. $(a_{i_1}, \dots, a_{i_k})$ and $(a_{j_1}, \dots, a_{j_k})$, where $\forall_l a_{i_l} = a_{j_l}$. A sequence without a tight twin is called twin-free. Problem of existence of infinite twin-free sequences is a natural extension of question about existence of infinite nonrepetitive sequences. It was proven by Thue that three symbols are enough to construct nonrepetitive sequences. Recently Grytczuk et. al. showed, using simpler method, inspired by algorithmic proof of Lovasz Local Lemma, that an alphabet of size 4 is enough to avoid repetitions. We use similar method to prove that seven symbols are enough to avoid tight twins.