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Khovanskii's Theorem and Effective Results on Sumset Structure

A remarkable theorem due to Khovanskii asserts that for any finite subset A of an abelian group, the cardinality of the h-fold sumset hA grows like a polynomial for all sufficiently large h. However, neither the polynomial nor what sufficiently large means are understood in general. We obtain an effective version of Khovanskii's theorem for any $A \subset \mathbb{Z}^d$ whose convex hull is a simplex; previously such results were only available for $d = 1$. Our approach also gives information about the structure of hA, answering a recent question posed by Granville and Shakan.