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Collections of lattice polytopes with a given mixed volume

Recently Esterov and Gusev showed that the problem of classifying generic sparse polynomial systems which are solvable in radicals reduces to the problem of classifying collections of lattice polytopes of mixed volume up to 4. Given the value of mixed volume m and dimension d, there exist only finitely many collections $(P_1, \ldots, P_d)$ of d-dimensional lattice polytopes of mixed volume m, up to unimodular transformations. One reason for this is that the volume of $P_1 + \cdots + P_d$ is bounded above by $O(m^{2^d})$, as follows by direct application of the Aleksandrov-Fenchel inequality. We employ more relations between mixed volumes to improve the bound to $O(m^d)$, which is asymptotically sharp. We also produce a complete classification of inclusion-maximal triples of lattice polytopes in $\mathbb{R}^3$ of mixed volume up to 4. This is joint work with Gennadiy Averkov and Christopher Borger.