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The asymptotic estimates and Hasse principle for multidimensional Waring's problem

Motivated by the asymptotic estimates and Hasse principle for multidimensional Waring's problem via the circle method, we prove for the first time that the corresponding singular series is bounded below by an absolute positive constant without any nonsingular local solubility assumption. The number of variables we need is near-optimal. By proving a more general uniform density result over certain complete discrete valuation rings with finite residue fields, we also establish uniform lower bounds for both singular series and singular integral in $\mathbb{F}_q[t]$. We thus obtain asymptotic formulas and the Hasse principle for multidimensional Waring's problem in $\mathbb{F}_q[t]$ via a variant of the circle method. This is a joint work with Wentang Kuo and Xiaomei Zhao.