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Asymptotic behaviour of the
v-number of homogeneous ideals

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Abstract: Let $S = K[x_1, \ldots, x_n]$ be the standard graded polynomial with coefficients over a field K, and let $I \subset S$ be a homogeneous ideal. The v-number of I is defined as the minimum degree of an homogeneous polynomial $f \in S$ such that $(I : f) \in \mathrm{Ass}(I)$ is an associated prime of I. This invariant was introduced in relation to minimum distance functions and Reed-Muller type codes. In the present talk, we show that the function $\mathrm{v}(I^k)$ is an eventually linear function $\alpha(I)k + b$, where $\alpha(I)$ is the initial degree of I and b is a suitable integer. We then survey the recent numerous studies on this and related topics, and some open questions.

Keywords: Associated primes. v-number. Graded rings. Monomial ideals. Integer Programming.