Explicit Bound on Collective Strength of Regular Sequences of Three Homogeneous Polynomials

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Abstract

Let $f_1, \cdots, f_r \in k[x_1, \cdots, x_n]$ be homogeneous polynomial of degree d. Ananyan and Hochster (2016) proved that there exists a bound $N = N(r, d)$ where if collective strength of $f_1, \cdots, f_r \geq N$, then $f_1, \cdots, f_r$ are regular sequence. In this paper, we study the explicit bound $N(r, d)$ when $r = 3$ and $d = 2, 3$ and show that $N(3, 2) = 2$ and $N(3, 3) > 2$.