AN UPPER BOUND FOR POLYNOMIAL LOG-VOLUME GROWTH OF AUTOMORPHISMS OF ZERO ENTROPY

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Abstract:

Let X be a normal projective variety of dimension $d\ge 2$ over an algebraically closed field and f an automorphism of X. Supposethat the pullback $f^*|_{\mathsf{N}^1(X)_\mathbf{R}}$ of f on the space $\mathsf{N}^1(X)_\bR$ of numerical $\mathbf{R}$-divisor classes is unipotent and denote the index of the eigenvalue 1 by $k+1$. We prove an upper bound for polynomial log-volume growth $\mathrm{plov}(f)$ of f, or equivalently, for theGelfand--Kirillov dimension of the twisted homogeneous coordinate ring associated with (X,f), as follows: \[\mathrm{plov}(f) \le (k/2 + 1)d.\] In characteristic zero, combining with the inequality $k\le 2(d-1)$ due to Dinh--Lin--Oguiso--Zhang, we obtain an optimal inequality that \[\mathrm{plov}(f) \le d^2,\] which affirmatively answers questions ofCantat--Paris-Romaskevich and Lin--Oguiso--Zhang. This is joint work with Chen Jiang.