Karpenko, Nikita A.
An ultimate proof of Hoffmann-Totaro’s conjecture. (English) Zbl 1506.11046

Given an anisotropic quadratic form \( \varphi \) over a field \( F \), the restriction \( \varphi_K \) is isotropic where \( K \) is the function field of its underlying quadric. The maximal dimension of a totally isotropic subform, denoted by \( i_1(\varphi) \), was conjectured by Hoffmann (originally in characteristic 2) and Totaro (arbitrary characteristic, see [B. Totaro, J. Algebr. Geom. 17, No. 3, 577–597 (2008; Zbl 1144.11031), p. 596]) to be at most \( 2^m \) where \( m \) is the the maximal integer for which \( 2^m \mid \dim \varphi - i_1(\varphi) \). The conjecture implies, in particular, that \( i_1(\varphi) \leq \frac{1}{2} \dim \varphi \), something that is well known in the nonsingular case (where \( i_1(\varphi) \) coincides with the first Witt index), and the bound is sharp when \( \varphi \) is a Pfister form.

The conjecture was proven by the author of this current paper to hold true when \( \text{char}(F) \neq 2 \) in [N. A. Karpenko, Invent. Math. 153, No. 2, 455–462 (2003; Zbl 1032.11016)], using Steenrod operations on modulo 2 Chow groups. In the works of Primozic, Haution and Scully, much of the machinery was adapted to the characteristic 2 case, and the conjecture remained open only in the case of singular, but not totally singular, quadratic forms over fields of characteristic 2, a case which the current paper resolves in the positive (as expected).

Reviewer: Adam Chapman (Tel Hai)

MSC:
11E04 Quadratic forms over general fields
11E81 Algebraic theory of quadratic forms; Witt groups and rings
14C25 Algebraic cycles

Keywords:
quadratic forms over fields; Chow groups; Steenrod operations

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References:


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