Krashen, Daniel; **Saltman, David J.**

Severi-Brauer varieties and symmetric powers. (English) Zbl 1068.14016

Popov, Vladimir L. (ed.), Algebraic transformation groups and algebraic varieties. Proceedings of the conference on interesting algebraic varieties arising in algebraic transformation group theory, Vienna, Austria, October 22–26, 2001. Berlin: Springer (ISBN 3-540-20838-0/hbk). Encyclopaedia of Mathematical Sciences 132. Invariant Theory and Algebraic Transformation Groups 3, 59-70 (2004).

The authors study the following question: let V be a variety over a field F such that its symmetric power $S^n(V)$ is rational: does this force V to be rational?

In the case F is not algebraically closed, the Severi-Brauer variety of a central simple algebra A of degree n provides a counterexample, since its nth symmetric power is proved to be rational.

In the second part of the paper the authors study the rationality of a field extension K/F by means of the unramified cohomology groups $H^i(K,\mu)_u$, where μ is the group of roots of one. In particular, they prove that these groups cannot be used to find a similar counterexample in the case F is algebraically closed.

For the entire collection see [Zbl 1051.14003].

Reviewer: L. Picco Botta (Torino)

MSC:

14E08 Rationality questions in algebraic geometry
14L30 Group actions on varieties or schemes (quotients)
14G99 Arithmetic problems in algebraic geometry; Diophantine geometry