

The Griffiths group
Wednesday 2-4pm, Theresienstr. 39, B 252

In this seminar we consider the Griffiths group of a smooth projective variety, which is defined as a subquotient of the Chow group. We go through some of the classical papers as well as some recent results.

The program and dates are a tentative schedule.

- **Basic Definitions (May 8)**

Define the Griffiths groups and explain some of the methods used to study this group for a complex variety such as intermediate Jacobians and Abel-Jacobi maps; a reference is, for example, Voisin's books 'Hodge Theory and Complex Algebraic Geometry I-II'.

- **The Griffiths example (May 15)**

Explain Griffiths example that for a general quintic threefold the Griffiths group in codimension 2 is a non-torsion group. A good source is, for example, SGA 7-2, Exp. XX.

- **Infinite Generation (May 29)**

Present examples, for when the Griffiths groups with is not finitely generated, following Clemens H.: "Homological equivalence, modulo algebraic equivalence, is not finitely generated", IHES 58, (1983), 19-38 and Paranjape K.: "Curves on 3-folds with trivial canonical bundle", Proc. Indian Acad. Math. Sci. 101, (1991), 199-213.

- **The Ceresa cycle (June 12)**

Explain Ceresa's example of a non-torsion element in a Griffiths group from Ceresa G.: " C is not algebraically equivalent to C^- in its Jacobian", Ann. Math. 117, (1983), 285-291.

- **Nori proof of infinite generation (June 19)**

Go through the details of Nori's proof of infinite generation, using the Ceresa cycle from Nori, M.: "Cycles on the generic abelian 3-fold", Proc. Indian Acad. Math. Sci. 99, (1989), 191-196.

- **Nori's Connectivity Theorem - I (July 3)**

The next two talks should cover Nori M.: "Algebraic cycles and Hodge theoretic connectivity", Inv. Math 111, (1993), 349-373. For an additional source, one might also look at the second volume of Voisin's book.

- **Nori's Connectivity Theorem - II (July 10)**

- **Divisibility in the Griffiths group - I (July 17)**

Explain the first example of a non-divisible Griffiths group from Bloch S. and Esnault H.: "The coniveau filtration and non-divisibility of algebraic cycles", Math. Ann. 304, (1996), 303-314.

- **Divisibility in the Griffiths group - II (July 24)**

This talk should cover a recent result by B. Totaro, which exhibits the first example of a Griffiths group, which is infinite modulo 2. Totaro, B.: “Complex varieties with infinite Chow groups modulo 2”, *Ann. Math.* 183, (2016), 363-375.