

The geometry of holomorphic and algebraic curves in
complex algebraic varieties

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Chow group of 0-cycles on surface over a p -adic field with infinite torsion subgroup

Shuji Saito

Graduate School of Mathematical Science

University of Tokyo

3-8-1 Komaba

Meguro, Tokyo, 153-8914

Japan

sshuji@msb.biglobe.ne.jp

Abstract

In this talk I would like to demonstrate how Hodge theory can play a crucial role in an arithmetic question. The issue is to construct an example of a projective smooth surface X over a p -adic field K such that for any prime ℓ different from p , the ℓ -primary torsion subgroup of $\mathrm{CH}_0(X)$, the Chow group of 0-cycles on X , is infinite. A key step in the proof is disproving a variant of the Bloch-Kato conjecture which characterizes the image of an ℓ -adic regulator map from a higher Chow group to a continuous étale cohomology of X by using p -adic Hodge theory. By aid of theory of mixed Hodge modules, we reduce the problem to showing the exactness of de Rham complex associated to a certain variation of Hodge structure, which follows from Nori's connectivity theorem.