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Section:

3. Number Theory and Arithmetic Algebraic Geometry

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Mazur - Bloch method for Siegel threefolds

Let X be a Siegel threefold and $V \in CH^2(X)(K)_0$ a Heegner cycle homologically equivalent to 0. Let $cl'(V) \in H^1(K, H^3(X, \mathbb{Z}_l(2)))$ be its Abel-Jacobi image (a high-dimensional analog of a Heegner point). By analogy with one-dimensional case we can expect that
(*) In many cases $cl'(V)$ is not of torsion.
We give an evidence that Mazur-Bloch method can be used to prove (*). First steps of application of this method for the present situation are described. The main step of Mazur-Bloch method is finding of a group $\Phi(H^3(X))$, and of the image of V in Φ. It is shown how to find this image under some simplifying assumptions. An important step that has to be made is finding of a desingularization of a model (constructed by de Jong) of X over $\mathbb{Z}_p$.