Indecomposable Higher Chow Cycles

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Abstract. Let $X$ be a projective smooth variety over a field $k$. In the first part we show that an indecomposable element in $CH^2(X, 1)$ can be lifted to an indecomposable element in $CH^3(X_K, 2)$ where $K$ is the function field of 1 variable over $k$. We also show that if $X$ is the self-product of an elliptic curve over $\mathbb{Q}$ then the $\mathbb{Q}$-vector space of indecomposable cycles $CH^3_{ind}(X, 2)_{\mathbb{Q}}$ is infinite dimensional.

In the second part we give a new definition of the group of indecomposable cycles of $CH^3(X, 2)$ and give an example of non-torsion cycle in this group.