On the 2-part of the Bloch-Kato conjecture for K_2 of some elliptic curves over the rationals

Rob de Jeu

Vrije Universiteit Amsterdam

Armand Borel in the 1970s defined regulator maps on the higher odd K-groups of a number field F, and, for $n \geq 2$, proved a relation between the resulting regulator of $K_{2n-1}(F)$ and the special value $\zeta_F(n)$ of the ζ-function of F. Inspired by this, Spencer Bloch constructed a regulator map for $K_2(E)$ of an elliptic curve E defined over the rationals, and proved, if E has complex multiplication, a similar relation between $L(E,2)$ and the resulting regulator of a certain element in $K_2(E)$. This relation involves a rational number, which, according to a later conjecture by Bloch and Kazuya Kato, should be interpreted using p-adic regulator maps for all prime numbers p. After reviewing the background, we discuss some calculations towards this conjecture for $p = 2$, using a certain family of elliptic curves over the rationals. This is joint work in progress with Neil Dummigan, Vasily Golyshev and Matt Kerr.