

Eisenstein cohomology, Bloch-Kato conjecture for Hecke characters, and Fontaine-Mazur conjecture for imaginary quadratic fields

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For certain algebraic Hecke characters χ of an imaginary quadratic field F we define an Eisenstein ideal in a Hecke algebra acting on cuspidal automorphic forms of GL_2/F . We prove a bound for its index in terms of the special L -value $L(0, \chi)$ by finding a congruence between an Eisenstein cohomology class (in the sense of G. Harder) and a cuspidal cohomology class in the cohomology of a symmetric space associated to GL_2/F .

Using the work of R. Taylor *et al.* on attaching Galois representations to cuspforms of GL_2/F we obtain from this a lower bound for the size of the Selmer group of a Galois character coinciding with the value given by the Bloch-Kato conjecture.

We further show, following work by Skinner and Wiles for \mathbf{Q} , how the Eisenstein ideal bound can be used to prove certain instances of the Fontaine-Mazur conjecture for imaginary quadratic fields. The latter is joint work in progress with Kris Klosin.