Traces of singular moduli on Hilbert modular surfaces

J. Rouse

`rouse@math.wisc.edu`

Mathematics Department
University of Wisconsin at Madison
480 Lincoln Dr.
Madison, WI 53706-1388
USA

Abstract

Suppose that $p \equiv 1 \pmod 4$ is prime and let $K = Q(\sqrt{p})$. Hirzebruch and Zagier proved that generating functions for the intersection numbers of Hirzebruch–Zagier divisors on the Hilbert modular surface $(H \times H)/\mathrm{SL}_2(O_K)$ are weight 2 modular forms. Using work of Bruinier and Funke, we show that generating functions for traces of singular moduli over these intersections are weakly holomorphic weight 2 modular forms. For the singular moduli of $j(z) - 744$ we compute these generating functions explicitly, and factorize their "norms" as products of Hilbert class polynomials.