

Title: Brandt matrices and ternary quadratic forms

Abstract: As proposed by Birch, one can construct partial Brandt matrices by the method of neighboring lattices applied to classes of ternary quadratic forms. This reduces the complexity of the problem from working with quaternary lattices (ideal classes on quaternion algebras) to working with ternary lattices.

We propose a refinement to the classic notion of proper equivalence of lattices which leads to the construction of the full Brandt matrices, at least in the squarefree level case. Moreover, this refinement leads naturally (and is motivated by!) to the definition of generalized ternary theta series. The net result is a construction of modular forms of half integral weight, which preserves the action of Hecke operators (Brandt matrices) and thus makes explicit the Shimura correspondence.