

1077-11-2923

Jorge Dioses*, Department of Mathematics, Oklahoma State University, Stillwater, OK 74074.

Relations between class numbers of binary cubic forms with different splitting types over a place in an imaginary quadratic field.

This study was motivated by a theorem of Jin Nakagawa. The theorem gives a precise relation between the class numbers of forms of positive discriminant and those of forms of negative discriminant. The forms of positive discriminant are those that factor into three real factors, while the ones with negative discriminant have an irreducible quadratic factor over \mathbb{R} . In essence, Nakagawa's theorem says there is a relation between the classes of one splitting type over \mathbb{R} with the other splitting type.

One natural problem suggested by Nakagawa's theorem is to explore whether or not such a relation is true over more general global fields or for splitting types over other primes. This paper generalizes this result to an imaginary quadratic fields. In that case, we can define two Dirichlet series: one for the lattice of binary cubic forms over the ring of integers and another one for its dual. The coefficients in both cases are class numbers. The final result shows that these two series are basically the same, up to a simple constant factor consisting of a power of 3. The proof relies on class field theory. (Received September 23, 2011)