SOME RESULTS ON ALGEBRAIC AND ARITHMETIC INVARIANTS

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Abstract

Let K be a number field. The ideal class group Cl_K is defined to be the quotient group J_K/P_K, where J_K is the group of fractional ideals of K and P_K is the group of principal fractional ideals of K. It is well known that Cl_K is finite. The class number h_K of a number field K is the order of Cl_K. The ideal class group is one of the most basic and mysterious objects in algebraic number theory. I will talk about p-divisibility of class number of new family $\mathbb{Q}(\sqrt{1-2m^p})$, where m is power of odd prime and p is odd prime. We realize particular case of lizuka's conjecture as corollary.

In 1979, Lenstra introduced the definition of the Euclidean ideal which is a generalization of Euclidean domain. Lenstra established that for a number field K with $\text{rank}(\mathcal{O}_K^\times) \geq 1$, the number ring $\mathcal{O}_K$ contains a Euclidean ideal if and only if the class group Cl_K is cyclic, provided GRH holds. Several authors worked towards removing the assumption of GRH. In this talk, I prove the existence of the Euclidean ideal class in abelian low degree extensions without the assumption of GRH.

We also discuss few results on ramification degree of compositum of complete discrete valued fields and modular degree of elliptic curve.