

On Steinitz classes of nonabelian Galois extensions and p -ary cyclic Hamming codes

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Let k be a number field and $Cl(k)$ its class group. Let Γ be a finite group. Let $R_t(k, \Gamma)$ be the subset of $Cl(k)$ consisting of those classes which are realizable as Steinitz classes of tamely ramified Galois extensions of k with Galois group isomorphic to Γ . Let p be a prime number. In the present talk, we suppose that $\Gamma = V \rtimes_{\rho} C$, where V is an \mathbb{F}_p -vector space of dimension $r \geq 2$, C a cyclic group of order $(p^r - 1)/(p - 1)$ with $\gcd(r, p - 1) = 1$, and ρ a faithful and irreducible \mathbb{F}_p -representation of C in V . We prove that $R_t(k, \Gamma)$ is a subgroup of $Cl(k)$ by means of an explicit description and properties of a p -ary cyclic Hamming code.

This is a joint work with M. Farhat and the main result of a paper in J. Number Theory (134 (2014) 93–108).