ON ELEMENTS WITH INDEX DIVISIBLE BY FIXED PRIMES IN A PARAMETRIC FAMILY OF BICYCLIC BIQUADRATIC FIELDS

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Abstract

In this talk we will present some results about primitive integral elements \( \alpha \) in the family of bicyclic biquadratic fields 
\[ L_c = \mathbb{Q} \left( \sqrt{(c-2)c}, \sqrt{(c+4)c} \right) \] which have index \( \mu(\alpha) \) divisible by fixed primes and coprime coordinates in given integral bases. Precisely, we show that if \( c \geq 11 \) and \( \alpha \) is an element with index \( \mu(\alpha) = 2^a 3^b \leq c + 1 \), then \( \alpha \) is an element with minimal index \( \mu(\alpha) = \mu(L_c) = 12 \). We also show that for every integer \( C_0 \geq 3 \) we can find effectively computable constants \( M_0(C_0) \) and \( N_0(C_0) \) such that if \( c \leq C_0 \), then there are no elements \( \alpha \) with index of the form \( \mu(\alpha) = 2^a 3^b \), where \( a > M(C_0) \) or \( b > N(C_0) \).