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Title: Composantes isotypiques de pro- p -extensions de corps de nombres et p -rationalité

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Let p be a prime number, and let K/k be a finite Galois extension of number fields with Galois group Δ of order coprime to p . Let S be a finite set of non-Archimedean places of k including the set S_p of p -adic places, and let K_S be the maximal pro- p extension of K unramified outside S . Let $G := G_S/H$ be a quotient of $G_S := \text{Gal}(K_S/K)$ on which Δ acts trivially. Put $X := H/[H, H]$. In this paper, we study the φ -component X^φ of X for all $\mathbb{Q}_p$ -irreducible characters φ of Δ , and, in particular, by assuming the Leopoldt conjecture, we show that for all non-trivial characters φ , the $\mathbb{Z}_p[[G]]$ -module X^φ is free if and only if the φ -component of the $\mathbb{Z}_p$ -torsion of $G_S/[G_S, G_S]$ is trivial. We also make a numerical study of the freeness of X^φ in cyclic extensions K/Q of degree 3 and 4 (by using families of polynomials given by Balady, Lecacheux, and more recently by Balady and Washington), but also in degree 6 dihedral extension over $\mathbb{Q}$: the results we get support a recent conjecture of Gras.

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