Year: 2019 | **Vol.: 94** | **Fasc.: 1-2**

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

Author(s): Christian Maire and Marine Rougnant

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 $G_S := \mathrm{Gal}(\mathrm{K}_S/\mathrm{K})$ on which Δ acts trivially. Put $\mathrm{X} := H/[H,H]$. In this paper, we study the φ-component X^φ of X for all Q_p-irreductible characters φ of Δ, and, in particular, by assuming the Leopoldt conjecture, we show that for all non-trivial characters φ, the $\mathrm{Z}_p[[G]]$-module X^φ is free if and only if the φ-component of the 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 Q: the results we get support a recent conjecture of Gras.

Address:
Christian Maire
Université Bourgogne Franche-Comté
FEMTO-ST Institute, CNRS
15B avenue des Montboucons
25030 Besançon cedex
France
and
Université Bourgogne Franche-Comté
Laboratoire de Mathématiques de Besançon
UMR CNRS 6623
UFR Sciences et Techniques
16 route de Gray
25030 Besançon Cedex
France

Address:
Marine Rougnant
Université Bourgogne Franche-Comté
Laboratoire de Mathématiques de Besançon
UMR CNRS 6623
UFR Sciences et Techniques
16 route de Gray
25030 Besançon Cedex
France