

Structure of the Galois group of the maximal unramified pro-2-extension of some \mathbb{Z}_2 -extensions

By ABDELMALEK AZIZI (Oujda), MOHAMMED REZZOUGUI (Oujda)
and ABDELKADER ZEKHNINI (Oujda)

Abstract. For a number field k , we consider the Galois group $G = \text{Gal}(\mathcal{L}(k_\infty)/k_\infty)$ of the maximal unramified pro-2-extension of the cyclotomic \mathbb{Z}_2 -extension k_∞ of k . In terms of transfer, we establish a necessary and sufficient condition for a 2-group to be abelian or metacyclic non-abelian whenever its abelianization is of type $(2^n, 2^m)$, with $n \geq 2$ and $m \geq 2$. Then we apply this result to construct an infinite family of real quadratic fields for which G is an abelian pro-2-group of rank 2.

ABDELMALEK AZIZI &
MOHAMMED REZZOUGUI &
ABDELKADER ZEKHNINI
MATHEMATICS DEPARTMENT
SCIENCES FACULTY
MOHAMMED PREMIER UNIVERSITY
OUJDA
MOROCCO

Mathematics Subject Classification: Primary: 11R23; Secondary: 20D15, 11R11, 11R20, 11R29, 11R32, 11R37.

Key words and phrases: Iwasawa theory, \mathbb{Z}_2 -extension, 2-class field tower, real quadratic field, 2-class group, metacyclic and non-metacyclic 2-group, capitulation.