

Gold, Robert; Madan, Manohar

Kida's theorem for a class of nonnormal extensions. (English) Zbl 0678.12005
Proc. Am. Math. Soc. 104, No. 1, 55-60 (1988).

Let E/F be an extension of \mathbb{Z}_p -fields of CM-type of degree p . The authors prove the following generalization of a theorem of Kida relating the Iwasawa invariants of E and F : If the normal closure L of E/F has a subfield K with $[L : K] = p$ and K/F normal then $\mu_{\bar{K}} = 0$ implies $\mu_{\bar{F}} = \mu_{\bar{E}} = 0$ and $\lambda_{\bar{E}} = \lambda_{\bar{F}} + (p - 1)(\lambda_{\bar{K}} + t - \delta)/[K : F]$. Here t is the number of primes, not dividing p , in K^+ which ramify in L^+ and split completely in K , where K^+, L^+ denote the maximal real subfields of K and L . Also $\delta = 1$ or 0 according as K contains the p -th roots of unity or not.

The authors give two proofs of this result. The first is arithmetic- algebraic in nature and uses previous results of the authors from Acta Arith. 46, 243-255 (1986; [Zbl 0603.12003](#)). The second proof is analytic in nature and uses techniques of *W. M. Sinnott* [Compos. Math. 53, 3-17 (1984; [Zbl 0545.12011](#))] which relate p -adic L -functions to Iwasawa invariants.

Reviewer: [C.Parry](#)

MSC:

- [11R18](#) Cyclotomic extensions
- [11R42](#) Zeta functions and L -functions of number fields
- [11S40](#) Zeta functions and L -functions

Cited in 1 Document

Keywords:

\mathbb{Z}_p -extension; Iwasawa invariants; p -adic L -functions

Full Text: [DOI](#)