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Title:	On the index of an algebraic integer and beyond
Authors:	Khanduja, S.K. (/jspui/browse?type=author&value=Khanduja%2C+S.K.)
Keywords:	Rings of algebraic integers Dedekind domains Valued fields
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Publisher:	Elsevier B.V.
Citation:	Journal of Pure and Applied Algebra, 224(7)
Abstract:	Let $K=Q(\theta)$ be an algebraic number field with θ in the ring AK of algebraic integers of K having minimal polynomial $f(x)$ over Q . For a prime number p , let $ip(f)$ denote the highest power of p dividing the index $[AK:Z[\theta]]$. Let $f^-(x)=\phi_1^-(x)\phi_2^-(x)\cdots\phi_r^-(x)$ be the factorization of $f(x)$ modulo p into a product of powers of distinct irreducible polynomials over Z/pZ with $\phi_i(x)\in Z[x]$ monic. Let the integer $l\geq 1$ and the polynomial $N(x)\in Z[x]$ be defined by $f(x)=\prod_{i=1}^r\phi_i(x)^{e_i}+pN(x)$, $N^-(x)\neq 0^-$. In this paper, we prove that $ip(f)\geq \sum_{i=1}^r u_i \deg \phi_i(x)$, where u_i is a constant defined only in terms of l, e_i and the highest power of the polynomial $\phi_i^-(x)$ dividing $N^-(x)$. Further a class of irreducible polynomials is described for which the above inequality becomes equality. The results of the paper quickly yield the well known Dedekind criterion which gives a necessary and sufficient condition for $ip(f)$ to be zero. In fact, these results are proved in a more general set up replacing Z by any Dedekind domain.
Description:	Only IISERM authors are available in the record.
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