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ON $+\infty$-ω_0-GENERATED FIELD EXTENSIONS

El Hassane Fliouet

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Abstract. A purely inseparable field extension K of a field k of characteristic $p \neq 0$ is said to be ω_0-generated over k if K/k is not finitely generated, but L/k is finitely generated for each proper intermediate field L. In 1986, Deveney solved the question posed by R. Gilmer and W. Heinzer, which consists in knowing if the lattice of intermediate fields of an ω_0-generated field extension K/k is necessarily linearly ordered under inclusion, by constructing an example of an ω_0-generated field extension where $[k^{p^{-n}} \cap K : k] = p^{2n}$ for all positive integer n. This example has proved to be extremely useful in the construction of other examples of ω_0-generated field extensions (of any finite irrationality degree). In this paper, we characterize the extensions of finite irrationality degree which are ω_0-generated. In particular, in the case of unbounded irrationality degree, any modular extension of unbounded exponent contains a proper subfield of unbounded exponent over the ground field. Finally, we give a generalization, illustrated by an example, of the ω_0-generated to include modular purely inseparable extensions of unbounded irrationality degree.

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El Hassane Fliouet
Regional Center for the Professions of Education and Training
Agadir, Morocco
e-mail: fliouet@yahoo.fr