

QUASIFINITE FIELDS OF PRESCRIBED CHARACTERISTIC AND DIOPHANTINE DIMENSION

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ABSTRACT. Let \mathbb{P} be the set of prime numbers, $\overline{\mathbb{P}}$ the union $\mathbb{P} \cup \{0\}$, and for any field E , let $\text{char}(E)$ be its characteristic, $\text{ddim}(E)$ the Diophantine dimension of E , \mathcal{G}_E the absolute Galois group of E , and $\text{cd}(\mathcal{G}_E)$ the Galois cohomological dimension of \mathcal{G}_E . This paper proves the existence of quasifinite fields $\Phi_q: q \in \mathbb{P}$, with $\text{ddim}(\Phi_q)$ infinity and $\text{char}(\Phi_q) = q$, for each index q . Also, it shows that for any integer $m > 0$ and $q \in \overline{\mathbb{P}}$, there is a quasifinite field $\Phi_{m,q}$ such that $\text{char}(\Phi_{m,q}) = q$ and $\text{ddim}(\Phi_{m,q}) = m$. This is used for proving that for any $q \in \overline{\mathbb{P}}$ and each pair $k \in \mathbb{N}$, $\ell \in (\mathbb{N} \cup \{\infty\})$ satisfying $k \leq \ell$, there exists a perfect field $E_{k,\ell,q}$ with $\text{char}(E_{k,\ell,q}) = q$, $\text{ddim}(E_{k,\ell,q}) = \ell$ and $\text{cd}(\mathcal{G}_{E_{k,\ell,q}}) = k$.

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