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Heights on totally p -adic numbers, and a question of Narkiewicz

Let F be a field which is generated over the rationals by elements of uniformly bounded degree. Narkiewicz conjectured that for any non-linear polynomial f in $F[x]$, there is no infinite f -invariant subset X of F . We will show that this conjecture is true, by studying canonical dynamical height functions on totally p -adic fields.