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The smallest Pisot element in the field of formal power series over a finite field. (English)

Zbl 1310.11106

Can. Math. Bull. 56, No. 2, 258-264 (2013).

Summary: *J. Dufresnoy* und *Ch. Pisot* [Ann. Sci. Éc. Norm. Supér. (3) 72, 69–92 (1955; Zbl 0064.03703)] characterized the smallest Pisot number of degree $n \geq 3$ by giving explicitly its minimal polynomial. In this paper, we translate Dufresnoy and Pisot's result to the Laurent series case. The aim of this paper is to prove that the minimal polynomial of the smallest Pisot element (SPE) of degree n in the field of formal power series over a finite field is given by $P(Y) = Y^n - \alpha XY^{n-1} - \alpha^n$, where α is the least element of the finite field $\mathbb{F}_q \setminus \{0\}$ (as a finite total ordered set). We prove that the sequence of SPEs of degree n is decreasing and converges to αX . Finally, we show how to obtain explicit continued fraction expansion of the smallest Pisot element over a finite field.

MSC:

11R06 PV-numbers and generalizations; other special algebraic numbers; Mahler measure

11A55 Continued fractions

12J99 Topological fields

Keywords:

Pisot element; continued fraction; Laurent series; finite fields

Full Text: DOI