A dynamical approach to N-continued fraction expansions

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Abstract

Recently (2008), Edward Burger and his co-authors introduced a new class of continued fraction algorithms, the so called N-continued fraction of the form

$$x = n_0 + \cfrac{N}{n_1 + \cfrac{N}{n_2 + \ddots + \cfrac{N}{n_k + \ddots}}} = [n_0; n_1, n_2, \ldots, n_k, \cdots]_N$$

where $N, d_i \in \mathbb{Z}$, $N, d_i \neq 0$. They showed that for every quadratic irrational number x there exist infinitely many eventually periodic N-continued fractions with period-length 1. In 2011, Maxwell Anselm and Steven Weintraub studied further the properties of N-continued fractions. One nice result they obtained is that for $N \geqslant 2$, every x between 0 and N has uncountably many N-continued fractions. In this talk we will give a dynamical approach to N-continued fraction expansions. Due to this approach, the remarkable above mentioned result by Anselm and Weintraub is immediately obvious. We also give the ergodic properties of various subclasses of N-continued fraction expansions.