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Abstract

The infinite Fibonacci word, $\dots 0110110101101$, considered as a 2-adic integer, is the limit of fixed points of a Fibonacci-like recursively defined sequence of linear functions. These fixed points, and their limit, have "remarkable continued fractions" of the form

$$-\frac{2^0}{1+}\;\frac{2^1}{1+}\;\frac{2^1}{1+}\;\frac{2^2}{1+}\;\frac{2^3}{1+}\;\cdots\;\frac{2^{F_n}}{1+}\;\cdots\;.$$

Previous work showed the Fibonacci word $1011010110110\dots$ as a traditional number (in the Euclidean metric) between 0 and 1 (i.e., preceded by "0.") has continued fraction $\frac{1}{2^0+}\;\frac{1}{2^1+}\;\frac{1}{2^1+}\;\frac{1}{2^2+}\;\frac{1}{2^3+}\;\cdots\;\frac{1}{2^{F_n}+}\;\cdots\;.$