

1135-05-2023

Benjamin Steinhurst* (bsteinhurst@mcdaniel.edu), 2 College Hill, McDaniel College,
Westminster, MD 21157. *Fibonacci Fractals: From Global to Local Structure*. Preliminary report.

Fibonacci words are constructed by taking $f_1 = 0$ and $f_2 = 1$ and defining $f_2 = 01$ by concatenation. So $f_3 = f_2f_1 = 010$. This is a fine example of a global, or large scale, construction rule. On the other hand L -systems create a sequence of drawing instructions by using a local substitution and then parsing the instructions symbol by symbol to create an image. As coming from Monnerot-Dumaine, a Fibonacci word can be drawn symbol by symbol using a drawing rule as one would for an L -system. There is a self-similarity in the Fibonacci word that becomes evident when these drawings are properly rescaled.

To even prove the existence of the scaling limit one has to create a local replacement rule to complement to global concatenation rule. Any understanding of the fractal geometry of the scaling limits also relies completely on this global-to-local transfer. The Fibonacci fractal is the simplest example of such a global sequence defining rule being transformed into a local substitution rule that can be studied. I will present the current status of the problem and point out several open questions that remain. (Received September 25, 2017)