A Class of Automatic Sequences

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Abstract

Automatic sequences were first developed by A. Cobham (1972) as uniform tag sequences arising from uniform tag systems in the general sense. A k-automatic sequence is thus realized as the image of a fixed point of a morphism on the internal symbol set of a uniform tag system of modulus k. For example, the uniform tag system $\langle\{0,1\},0,w\rangle$ with $w(0) = 0\,1$, $w(1) = 1\,0$, corresponds to the Thue-Morse 2-automatic sequence

$$0\,1\,1\,0\,1\,0\,0\,1\,1\,0\,0\,1\,0\,1\,1\,0\,1\,0\,0\,1\,0\,1\,1\,0\,0\,\ldots$$

as a fixed point of w. In this talk we show that the characteristic sequence of a regular language over an alphabet of k letters determines a uniform tag system of modulus k and thus is k-automatic. This is joint work with Michel Rigo, Université de Liège, Belgium.