

1123-68-10

Narad Rampersad* (n.rampersad@uwinnipeg.ca). *Decidable properties of automatic sequences.*

A k -automatic sequence is a sequence (of integers or just symbols) that can be generated by a finite automaton in the following sense: Each state of the automaton has an associated output and the n -th term of the sequence is obtained as the output of the state reached by the automaton after reading the digits of n written in base k . The prototypical example is the 2-automatic Thue-Morse sequence, whose n -th term is equal to the sum of the binary digits of n modulo 2. Some classical work of Buchi gives an equivalent definition of k -automatic sequences in terms of a certain extension of Presburger arithmetic. This extension remains decidable and in recent years many researchers (notably Shallit) have used the decidability of this theory to give entirely computerized proofs of many combinatorial properties of automatic sequences. For instance, a classical combinatorial property of the Thue-Morse sequence is that it does not contain the same sequence of terms three times in a row. This is an example of a combinatorial property that is provable by these automated techniques. We give a survey of this approach and mention some recent new results that have been proven by means of such techniques. (Received July 06, 2016)