Automatic sequences and pseudorandomness

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Abstract

Automatic sequences are generated by a finite automaton and are one of the main objects in combinatorics on words. The Thue–Morse is a famous example of such a sequence and has many links with other fields of mathematics, such as number theory. Automatic sequences are highly predictable and far from being a pseudorandom sequence, which is a deterministically generated sequence close to a random one. For instance, an automatic sequence's correlation measure of order 2, or auto-correlation, is way larger than the expected behavior for a random sequence. Finally, we will also discuss the generalization of this result to the more general framework of morphic sequences.