

Seminář Kombinatorické a algebraické struktury
Dopplerova institutu pro matematickou fyziku
a aplikovanou matematiku

Construction of some sequences by cellular automata

Pierre-Adrien TAHAY

FJFI, České vysoké učení technické v Praze

Abstrakt

Finite automata are one of the most basic models of computation. A sequence $(u_n)_{n \geq 0}$ such that u_n can be computed by a finite automaton with the base- k representation of n is called k -automatic sequence. On the other hand, cellular automata are dynamical systems defined by a local rule which acts uniformly and synchronously on the configuration space.

In 2015, Rowland and Yassawi established a link between these two objects. They showed that, if p is a prime number, the columns of linear cellular automata are p -automatic sequences and conversely all p -automatic sequences can be realized by some linear cellular automaton with memory. Moreover, they provide a constructive method to generate a given p -automatic sequence by an explicit cellular automaton.

In this talk, I will present several constructions of p -automatic sequences by linear cellular automata, in particular the characteristic function of the set of sums of three squares which is a 2-automatic sequence, and some constructions of nonautomatic sequences by nonlinear cellular automata, such that the characteristic function of the squares, which is an emblematic nonautomatic sequence.

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Semináře se konají pravidelně každé úterý v 11:30 hod. na katedře matematiky FJFI v učebně T112. Program plánovaných vystoupení je k dispozici na adrese <http://kmlinux.fjfi.cvut.cz/~ambrop1/acs>