

Diagonals of rational functions and substitution dynamical systems on \mathbb{Z}_p

Reem Yassawi*

ryassawi@trentu.ca

Many sequences of p -adic integers project modulo p^α to p -automatic sequences for every $\alpha \geq 0$. Examples include algebraic sequences of integers, which satisfy this property for every prime p , and diagonals of rational functions, which satisfy this property for almost every prime. For such a sequence, we construct a profinite automaton that projects modulo p^α to the automaton generating the projected sequence. In general, the profinite automaton has infinitely many states. We consider the closure of the orbit, under the shift map, of the p -adic integer sequence, defining a shift dynamical system. We describe how this shift is a letter-to-letter coding of a shift generated by a constant-length substitution defined on an uncountable alphabet. We establish some dynamical properties of these shifts, and discuss the relation between limit sets of this shift and the p -adic interpolation of the original sequence.

This is joint work with Eric Rowland.

*LIAFA, Université Paris Diderot-Paris7, Case 7014, 75205 Paris Cedex 13, FRANCE