

New results related to the Sakoda and Sipser question

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It is well-known that the possibility of moving the input head in both directions does not increase the computational power of finite automata. Indeed, *two-way finite automata* characterize the class of regular languages, both in the deterministic and in the nondeterministic version.

In 1978, Sakoda and Sipser posed the question of the cost, in the number of the states, of the simulation of two-way nondeterministic automata by equivalent two-way deterministic automata. They conjecture that this cost is exponential. In spite of all attempts to solve it, the question is still open.

In this talk we present some recent results related to this question. In particular, we discuss some relationships with open questions about complexity classes defined by Turing machine working in logarithmic space.