1012-68-125 **Ansis Rosmanis*** (ansis.rosmanis@gmail.com), Zellu iela 8-108, LV-1002 Riga, Latvia.

Nondeterministic finite-state automata with a unary alphabet. Preliminary report.

For arbitrary natural number n for each nondeterministic finite-state automaton (NFA) with n states, a deterministic finite-state automaton (DFA) exists with at most $f(n)$ states which accepts the same language. Our aim was to find out the function $f(n)$ for automata with a unary alphabet. We classify the states of each NFA. Two states belong to the same class iff there is a path from the first state to the second in the automaton graph and vice versa. At first $f(n)$ was found for a special case when the NFA has a property that from each state of the automaton exists a path to any other state of the automaton. In this case $f(n) = (n-1)^2 + 2$. It is known that for binary alphabets in general case $f(n) = 2^n$. But our result shows that for a unary alphabet, the size advantage of NFA over DFA is not so big and $f(n)$ increases subexponentially, but still faster than any polynomial. For both special and general cases we present such NFA with n states that DFA need exactly $f(n)$ states to accept the same language. (Received September 16, 2005)