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([bsteinberg@ccny.cuny.edu](mailto:bsteinberg@ccny.cuny.edu)). *Computing closures in the pro-nilpotent topology on a free group.*

In the nineties, Margolis, Sapir and Weil gave an algorithm to compute the closure of a finitely generated subgroup of a free group in the pro-nilpotent topology.

Motivated by questions in automata theory, we provide an algorithm to compute the closure of a language accepted by a finite state automaton in the the pro-nilpotent topology. This boils down to computing the closure of a product  $H_1H_2 \cdots H_n$  of finitely generated subgroups in the pro-nilpotent topology. Here, a crucial role is played by the Ribes-Zaleskii product theorem, which implies that if  $p$  is a prime then a finite product of pro- $p$  closed finitely generated subgroups of a free group is closed in the pro- $p$  topology. (Received March 16, 2017)