

1086-03-421

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([shore@math.cornell.edu](mailto:shore@math.cornell.edu)). *The complexity of ascendant sequences in locally nilpotent groups.*

We work in the context of locally nilpotent groups and cyclic ascendant subgroups.

The standard definition of an ascendant sequence requires quantification over all ordinals. For countable groups it is not difficult to show that we only need quantify over all countable ordinals, or all ordinals less than  $\omega$ . This suggests that, computationally speaking, such sequences are complex and that for all natural numbers  $n$  one can construct a group with ascendant sequences computing the  $n^{\text{th}}$  iteration of Turing's Halting Set. However, our main result says that all cyclic (finitely generated) ascendant subgroups in locally nilpotent groups are uniformly computably enumerable with respect to the (finitely many) generator(s). This shows that ascendant sequences are actually (computationally speaking) very simple.

This is joint work with Richard Shore. (Received August 31, 2012)