Groups generated by bireversible Mealy automata: a combinatorial explosion

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The study on how (semi)groups grow has been highlighted since Milnor's question on the existence of groups of intermediate growth (faster than any polynomial and slower than any exponential) in 1968. A very first example of such a group was given by Grigorchuk in 1983 in terms of an automaton group, and, until Nekrashevych's very recent work, all the known examples of intermediate growth groups were automaton groups or based on automaton groups.

This talk originates in the following question: is it decidable if an automaton group has intermediate growth? I will show that in the case of bireversible automata, whenever there exists at least one element of infinite order, the growth of the group is necessarily exponential.