Automata in W-Toposes, and General Myhill-Nerode Theorems

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Abstract.
We extend the functorial approach to automata by Colcombet and Petrişan [1] from the category of sets to any W-topos and establish general Myhill-Nerode theorems in our setting, including an explicit relationship between the syntactic monoid and the transition monoid of the minimal automaton. As a special case we recover the result of Bojańczyk, Klin and Lasota [2] for orbit-finite nominal automata by considering automata in the Myhill-Schanuel topos of nominal sets.

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References

[1] Thomas Colcombet and Daniela Petrişan. Automata Minimization: A Functorial Approach. *Logical Methods in Computer Science ; Volume 16*, page 1712.07121, March 2020.

[2] Mikołaj Bojańczyk, Bartek Klin, and Sławomir Lasota. Automata theory in nominal sets. *Logical Methods in Computer Science*, 10 issue 3(4):1402.0897, August 2014.

[3] Victor Iwaniack. Automata in toposes, and general Myhill-Nerode theorems, preprint arXiv:2307.14855, July 2023.