

Automata and Formal Languages – Homework 12

Due 26.1.2012.

Exercise 11.4 (d)

Exercise 12.1

When interpreting *MSO* over finite words, we of course quantify the second-order variables over *finite* sets only. When applying it to infinite words, we can either keep this kind of quantification which is sometimes called *weak monadic second-order logic*, or we can quantify over arbitrary (also infinite) sets which is the usual interpretation of *MSO*.

- Give an example of a formula that is a tautology in $MSO(<)$ interpreted over the structure $(\mathbb{N}, <)$ and a contradiction in $WMSO(<)$.
- Give an $MSO(<)$ -formula $\text{finite}(X)$ with one free second-order variable X s.t.

$$(w, \mathcal{I}) \models \text{finite}(X) \text{ iff } \mathcal{I}(X) \text{ is a finite set.}$$

Exercise 12.2

Run the emptiness algorithms from the lecture on

- automata from 11.2,
- $(\{0, 1, 2, 3, 4\}, \delta, 0, \{2\})$, where $\delta(0) = \{4\}, \delta(1) = \{3\}, \delta(2) = \{1\}, \delta(3) = \{1\}, \delta(4) = \{0, 2\}$.