



Description Logics

Exercise Sheet 8

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Summer Semester 2011

Exercise 1

Recall that a *propositional Horn clause* is a formula of the form $p_1, \dots, p_k \rightarrow p$, where p_1, \dots, p_k are propositional letters and p is a propositional letter or \perp . A *Horn formula* is a set of Horn clauses. Also recall that the satisfiability of Horn formulas can be decided in linear time.

Show that the emptiness problem for looping tree automata can be decided in linear time by giving a linear-time reduction to the satisfiability of Horn formulas.

You may assume that the transition table is given in the form of a list of transitions such that transitions for the same state q on the left are grouped together and states without transitions are marked as such in the transition table.

Exercise 2

Show that the transformation of \mathcal{FL}_0 -concept descriptions into normal form requires only polynomial time.

Exercise 3

Show that subsumption in \mathcal{FL}_0 w.r.t. acyclic TBoxes is in co-NP by giving a polytime reduction from this problem to the inclusion problem for acyclic finite automata (which is in co-NP).