I N F O R M A T I K

Universität
des
Saarlandes
FR Informatik

Harald Ganzinger
Uwe Waldmann

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Tutorials for "Logic in Computer Science"
Exercise sheet 7

Exercise 7.1:
Prove the lifting lemma for factorisation inferences: If C is a (possibly non-ground) clause, $C\sigma$ is a ground instance of C, and

$$\frac{C\sigma}{C'}$$

is a (propositional) factorisation inference, then there exists a factorisation inference

$$\frac{C}{C''}$$

and a substitution τ such that $C' = C''\tau$.

Exercise 7.2:
Let the ordering on atoms be defined by $q \succ p(a_4) \succ p(a_3) \succ p(a_2) \succ p(a_1) \succ p(a_0)$ and let N be the following set of ground clauses:

$$q \vee q \vee p(a_1)$$
$$q \vee p(a_1)$$
$$\neg p(a_3) \vee p(a_2) \vee p(a_0)$$
$$p(a_3) \vee p(a_1) \vee p(a_0)$$
$$p(a_2) \vee \neg p(a_1)$$
$$\neg p(a_1) \vee p(a_1)$$
$$p(a_1) \vee p(a_0)$$

Which of the clauses in N are redundant with respect to N?

Exercise 7.3:
Find a well-founded atom ordering $\succ$ and a selection function S such that the following

set of clauses is saturated under $Res_S^{\succ}$ (ordered resolution with selection):

$$\neg p(f(x)) \vee p(x)$$
$$p(g(y))$$
$$\neg p(x) \vee \neg q(f(x))$$
$$\neg q(f(a)) \vee q(f(b))$$
$$q(f(x)) \vee q(g(x))$$

Put your solution into the mail box at the door of room 627 in the MPI building (46.1) before June 3, 11:00. Don't forget to write your name and the name of your tutorial group (B, C, D) on your solution.