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FR Informatik

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Tutorials for "Automated Reasonines WS20/21"
Exercise sheet 6

Exercise 6.1:
Compute an mgu for the following unification problems using both $\Rightarrow_{\mathrm{SU}}$ and $\Rightarrow_{\mathrm{PU}}$ where x, y ,z and their primed versions are all variables and there is only one sort:

1. $\{f(x, h(x, y)) = f(f(y, z), h(y, z'))\}$

2. $\{h(x, y) = z, g(f(x, x)) = z', g(g(f(a, y))) = g(z')\}$

3. $\{h(x, y) = h(x', y'), y' = f(x, a), f(g(a), z) = y\}$

Exercise 6.2:
Compute a most general unifier of $P(h(x_1), x_4, g(x_2, f(x_2)))$ and $P(h(x_4), g(f(x_3), x_5), x_1)$.

Exercise 6.3:
Prove the following statements or provide a counter example:

1. If $|s| > |t|$ then there is no substitution σ with $s\sigma = t$.

2. If $|\operatorname{vars}(s)| > |\operatorname{vars}(t)|$ then there is no substitution σ with $t\sigma = s$. where vars computes the set of variables from a term.

Exercise 6.4:
Check satisfiability of the following first-order clauses using NRCL.

$$
\begin{array}{llll}
(1) & \neg R(x, x) & (2) & R(a, b) \\
(3) & \neg R(x, y) \vee R(y, x) & (4) & \neg R(x, y) \vee \neg R(y, z) \vee R(x, z)
\end{array}
$$

Is is not encouraged to prepare joint solutions, because we do not support joint exams.