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FR Informatik

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Tutorials for "Automated Reasoning WS18/19"
Exercise sheet 7

Exercise 7.1 (3.29):
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:

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 7.2 (3.31):
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 7.3 (3.30):
Check whether the below unification problems have a solution using $\Rightarrow_{\mathrm{PU}}$ where x, y, z, possibly indexed, are variables. If a unifier exists, present it.

1. $\{f(g(x, y), z) = z_1, z_1 = x_1, x_1 = f(y_1, h(z_1, a))\}$
2. $\{f(g(x, y), z) = z_1, z_1 = f(y_1, h(x_2, a)), x_2 = g(a, b)\}$
3. $\{f(z, g(x, y)) = f(x_1, x_1), x = h(y_1, y_1), y = h(z_1, z_1)\}$
4. $\{f(g(a, y), z) = z_1, z_1 = x_1, x_1 = f(g(y_1, a), z_2), g(y_1, a) = g(b, x_2)\}$
5. $\{f(z, g(x, y)) = f(x_1, x_1), x = h(y_1, y_1), y = h(x_2, z)\}$

Exercise* 7.4 (3.35):
Prove: if σ_1, σ_2 are two mgus for two terms s, t, then they are identical up to variable renaming.

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