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Tutorials for “Automated Reasoning”
Exercise sheet 8

Exercise 8.1: (8 P)

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

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

Exercise 8.2: (6 P)

Check whether the below unification problems have a solution using \Rightarrow_{PU} where x, y, z , possibly indexed, are variables and there is only one (implicit) sort. If a unifier exists, present it.

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

Exercise 8.3: (4 P)

Prove that \Rightarrow_{PU} terminates.

Submit your solution in lecture hall E1.3, Room 001 during the lecture on January 17. Please write your name and the date/time of your tutorial group (Wed-Fabian, Wed-Tobias) on your solution.

Joint solutions, prepared by up to three persons together, are allowed (but not encouraged). If you prepare your solution jointly, submit it only once and indicate all authors on the sheet.