INFORMATIK

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FR Informatik

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Tutorials for "Decision Procedures for Logical Theories"
Exercise sheet 12

Exercise 12.1: (*6 P.*)
Prove: If the inference system $\triangleright_{\mathsf{L}}$ for list unification terminates with $\emptyset, R$, then R is a terminating rewrite system with rules $x \approx t$ containing at most one rule for each x. (Rules are oriented from left to right and variables are treated as constants.)

Exercise 12.2: (*4 P.*)
Show: If E is of unification type finitary, S is an E-unification problem, and C_1 and C_2 are two minimal complete sets of E-unifiers of S, then C_1 and C_2 have the same cardinality.

Exercise 12.3: (*4 P.*)
In Proposition 5.1 it has been stated that two subtitutions σ and τ with $\sigma \leq \tau$ and $\tau \leq \sigma$ must be equal up to bijective variable renaming. For the relation $\lesssim_E^X$, this does not hold: Consider the set of equations $\mathrm{I} = \{x * x \approx x\}$ and the substitutions $\sigma = [y/x]$ and $\tau = [y * z/x]$. Show that $\sigma \lesssim_{\mathrm{I}}^{\{x\}} \tau$ and $\tau \lesssim_{\mathrm{I}}^{\{x\}} \sigma$, but that there is no bijective renaming ρ such that $x\sigma \approx_I x\tau\rho$.

Exercise 12.4: (*6 P.*)
Give a minimal complete set of AC1-unifiers and a minimal complete set of AC-unifiers of the equation $x^2 y \approx az$.

Put your solution into the mail box at the door of room 627 in the MPI building (46.1) before February 6, 14:00.