Universität des Saarlandes
FR Informatik

Tutorials for "Automated Reasoning II"
Exercise sheet 11

Exercise 11.1: (P)
Prove that superposition is still complete if Equality Factoring is replaced by Merging Paramodulation and standard Factoring on positive equations:

Merging Paramodulation $(N \uplus \{C \vee s \approx t, D \vee l \approx r[s'] \vee l' \approx r'\}) \Rightarrow_{\text{SUPE}} (N \cup \{C \vee s \approx t, D \vee l \approx r[s'] \vee l' \approx r' \vee (C \vee D \vee l \approx r[t] \vee l \approx r')\sigma\}\})$

where σ is the composition of the mgu σ_1 of s, s' and the mgu σ_2 of $l\sigma_1$, $l'\sigma_1$, $s\sigma \npreceq t\sigma$, $l\sigma \npreceq r\sigma$, $(s \approx t)\sigma$ strictly maximal in $(C \vee s \approx t)\sigma$, nothing selected and $(l \approx r)\sigma$ is maximal in $(D \vee l \approx r[s'] \vee l' \approx r')\sigma$ and nothing is selected

Exercise 11.2: (P)
Prove that the below Contextual Rewriting rule can be justified by abstract redundancy.

Contextual Rewriting $(N \uplus \{C \vee s \approx t, D \vee L[s']\}) \Rightarrow_{\text{SUPE}} (N \cup \{C \vee s \approx t, D \vee L[t\sigma]\})$

where σ is a matcher from s to s', $s\sigma = s'$, $s\sigma \succ t\sigma$, $D \succ C\sigma$, for all $l \napprox r \in C$ it holds $N^{\prec D} \models \neg D' \rightarrow l \approx r$ where $D' \subseteq D$ are the negative equations in D, and for all $l \approx r \in C$ it holds $N^{\prec D} \models l \approx r \rightarrow D''$ where $D'' \subseteq D$ are the positive equations in D