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Tutorials for "Automated Reasoning II"
Exercise sheet 7

Exercise 7.1:
Is the following set of clauses saturated up to redundancy?

$$g(z) \not\approx c \quad (1)$$
$$f(b,b) \approx b \vee g(g(b)) \approx b \quad (2)$$
$$f(y,a) \approx a \quad (3)$$
$$f(x,x) \approx x \quad (4)$$

Use the LPO with $g > f > a > b > c$ as term ordering.

Exercise 7.2:
Prove the lifting lemma (Lemma 3.7) for equality factoring inferences.

Exercise 7.3:
Compute the rewrite systems R_C and R_∞ for the set of clauses

$$f(a) \approx d \vee f(a) \approx c \quad (1)$$
$$a \not\approx d \vee f(b) \approx f(d) \quad (2)$$
$$f(c) \approx f(d) \quad (3)$$
$$f(d) \approx d \vee f(d) \approx b \quad (4)$$
$$a \approx b \quad (5)$$
$$c \approx d \quad (6)$$

Use the KBO with $f > a > b > c > d$ and weight 1 for all symbols as term ordering. Which is the smallest clause C such that C is neither productive nor true in R_C?

Exercise 7.4:
Compute R_∞ for the clause set $\{f(x) \approx a\}$ and the signature $\Sigma = (\{f/1,\ g/1,\ a/0\}, \emptyset)$; use the LPO with $g > f > a$.

Bring your solution (or solution attempt) to the tutorial on Jan. 23.