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Tutorials for “Automated Reasoning WS18/19”
Exercise sheet 4

Exercise 4.1 (2.98):

Check satisfiability of the below propositional clauses using $\Rightarrow_{\text{CDCL}}$.

- (1) $\neg P4 \vee P3$ (2) $\neg P3 \vee P4$ (3) $P1 \vee P2 \vee P4$
(4) $\neg P3 \vee \neg P4$ (5) $\neg P1 \vee \neg P4 \vee P2$ (6) $\neg P2 \vee \neg P4 \vee P1$
(7) $\neg P1 \vee \neg P2 \vee P4$

Exercise 4.2 (2.55):

Demonstrate the Superposition partial model construction on the following set of clauses

$$N = \{\neg Q_0 \vee \neg P_2 \vee Q_1, \neg Q_1 \vee Q_2, P_0 \vee Q_0, \neg Q_0 \vee P_1, Q_0 \vee P_1\}.$$

Use the atom ordering $Q_2 \succ P_2 \succ Q_1 \succ P_1 \succ Q_0 \succ P_0$.

Exercise* 4.3 (2.54):

Which of the following statements are true or false? Provide a proof or a counter example.

1. If $N_{\mathcal{I}} \models N$ then N is saturated.
2. If $\delta_C = \{P\}$ while constructing $N_{\mathcal{I}}$ then for all clauses $D = P \vee D'$ with $C \neq D$ we have $\delta_D = \emptyset$, $D \in N$.
3. If all clauses in N have at most one positive literal and there is no clause in N having only negative literals then $N_{\mathcal{I}} \models N$.

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