

Automated Theorem Proving, SS 2022. Seminar 3

1. Apply the DPLL algorithm to the following set of clauses:

$$\begin{aligned} &A \vee B \vee \overline{C}, \quad \overline{A} \vee C \vee \overline{D}, \quad B \vee C, \\ &B \vee \overline{C} \vee D, \quad \overline{A} \vee D, \quad A \vee \overline{C} \vee \overline{D}, \\ &\overline{B} \vee \overline{C}, \quad \overline{A} \vee B \vee \overline{C} \vee \overline{D}, \quad A \vee \overline{B} \vee C \end{aligned}$$

2. In the previous exercise, study what happens in the DPLL algorithm if the last clause is missing.
3. Apply the resolution principle to the set of clauses from exercise 1.
4. Apply the resolution principle to the following set of clauses:
$$A \vee B, \quad \overline{A} \vee C \vee D, \quad C \vee \overline{D}, \quad \overline{B} \vee \overline{C}, \quad \overline{A} \vee B \vee \overline{C}, \quad A \vee \overline{B} \vee C \vee D.$$
5. Apply the DPLL algorithm to the set of clauses from exercise 4.
6. Find the sequent rule for disjunction in the goal. (See the style used in the lecture for finding the sequent rules for negation and conjunction.)
7. Find the sequent rule for implication in the assumption and in the goal.
8. Find the sequent rule for equivalence in the assumption and in the goal.