

Chapter 6

DPLL Modulo Theories

6.1 Conjunctive Normal Form

6.2 Basic DPLL

6.3 DPLL Calculus

The state of the algorithm

Rule 1: Decide

The first rule simply picks a literal ℓ and decides to set it to true or false. We call such a literal a *decision* literal, and designate it ℓ^d

State is of the form I

If $\ell \notin I$ and $\ell \in F$

Then transform state into $I\ell^d$

Example 6.A ...

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Rule 2: Propagate

State is of the form I

If $I \models \neg C$, where $C \vee \ell \in F$ and $\ell \notin I$

Then transform state into $I\ell$

Example 6.B ...

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Rule 3: UNSAT

State is of the form I

If $I \models \neg C$, where $C \vee F$ and $\ell^d \notin I$, for any literal ℓ

Then transform state into F is unsatisfiable

Example 6.C ...

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Rule 4: Backjump

State is of the form $I\ell^d I'$

If there is a clause $C \vee \ell'$, where $F \Rightarrow (C \vee \ell')$ is valid, $I \models \neg C$, and $\ell' \notin I$

Then transform state into $I\ell'$

Example 6.D ...

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Soundness and Completeness

Clause learning

6.4 DPLL Modulo Theories