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Tutorials for Decision Procedures
Exercise sheet 11

Exercise 1: Nelson-Oppen 8 Points

Apply the deterministic version of Nelson-Oppen to the following $T_{\mathsf{E}} \cup T_{\mathbb{Q}}$-formulae:

(a) $x + y = z \ \wedge \ f(z) = x + y \ \wedge \ f(f(x + y)) \neq z.$

(b) $g(x+y, z) = f(g(x, y)) \wedge x+z = y \wedge z \geq 0 \wedge x \geq y \wedge g(x, x) = z \wedge f(z) \neq g(2x, 0)$

Exercise 2: DPLL(T)

Consider the following formula

$$\begin{aligned} &f_b(i) \neq f_c(i) \wedge \\ &f_b(j) = v \wedge (i \neq j \rightarrow f_b(i) = f_a(i)) \wedge \\ &f_c(j) = v \wedge (i \neq j \rightarrow f_c(i) = f_a(i)) \end{aligned}$$

(a) Compute the propositional core in CNF.

(b) Run the DPLL(T) algorithm by repeatedly applying the rules from the lecture. Is the formula satisfiable?