



1 Tableaux in propositional logic

Exercise 1.1: Draw a finished tableau with the root

$$F(((C \vee e) \wedge (D \vee \neg e)) \Leftrightarrow (C \vee D))$$

where C, D, e are propositional letters. Discuss the changes in the tableau when implication \Rightarrow is used instead of equivalence \Leftrightarrow in the root node.

Exercise 1.2: Prove that the following formulas are tautologies using tableau method:

- $\neg(p \Rightarrow q) \Rightarrow (q \Rightarrow p)$
- $((p \vee q) \Rightarrow (p \vee r)) \Rightarrow (p \vee (q \Rightarrow r))$

Exercise 1.3: Prove the following logical consequence:

$$\{q \Rightarrow r, r \Rightarrow (p \wedge q), p \Rightarrow (q \vee r)\} \models (p \Leftrightarrow q).$$