2D1453, 2006-07, assignment #5

Mads Dam

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Exercise 1. Show that if $\Gamma \vdash_G^t B$ then $\Gamma \vdash_G^v B$.

Exercise 2. How can we understand the sequent $\Rightarrow$?

Exercise 3. Prove prop. 2.

Exercise 4. Assume that invertibility has been shown for all connectives. Prove prop. 3 from this.

Exercise 5. Implement propositional resolution in pseudocode. That is, give a (nondeterministic) algorithm that receives a set of normal clauses as input and returns 1 iff the input set is inconsistent. Show how your algorithm operates by running it on a suitable test formula that causes all branches of the algorithm to be exercised. Show the intermediate results to document how the algorithm works.

Exercise 6. Implement a propositional tableaux prover in pseudocode. Try out the algorithm as in exercise 5. You can use the same test formula.

Exercise 7. Give an example to show why the GCL rules are in general impure.

Exercise 8. Using the final resolution algorithm of the paper, prove the formula:

$$(\exists x, y, R(x,y) \wedge \neg P(y)) \vee \neg \exists x, y.R(x,y) \vee \exists z.P(z)$$