

Logic 1, WS 2008. Homework 6, given Dec 3, due Dec 10.

1. Show the equivalence of the sequents $\Phi, \neg\varphi \vdash \varphi, \Psi$ and $\Phi \vdash \varphi, \Psi$.
2. Find the transformations of negated disjunction, negated implication, and negated equivalence.
3. Construct the unique goal sequent calculus proof of:

$$(A \wedge B) \Rightarrow C \vdash (A \Rightarrow C) \vee (B \Rightarrow C).$$

4. Construct the unique goal sequent calculus proof of:

$$(A \vee B) \Rightarrow C \vdash (A \Rightarrow C) \wedge (B \Rightarrow C).$$

5. Evaluate the truth value of the formula

$$((\forall x(P[x] \Rightarrow P[f[x]])) \wedge P[a]) \Rightarrow P[f[f[a]]]$$

over the interpretation I having the domain $D = \{0, 1\}$ and $a_I = 0$, $f_I[0] = 1$, $f_I[1] = 0$, $P_I[0] = \mathbb{F}$, and $P_I[1] = \mathbb{T}$.

6. (Optional) Formulate the induction principle for formulae in first order predicate logic.