

Logic 1, WS 2009. Homework 3, given Nov 5, due Nov 12.

1. Prove the correctness of the sequent rule for conjunction in the goal, using the transformation of sequents into disjunction.
2. Obtain the sequent rule for disjunction in the goal, using the sequent rules for negation and conjunction.
3. Obtain the sequent rules for implication in the assumptions and for implication in the goal, using the sequent rules for negation, conjunction, and disjunction.
4. Obtain the rule for Modus Tollens, using other rules and reasoning about the redundancy of a proof branch.
5. Prove or disprove by sequent calculus that:

$$(A_1 \Rightarrow B_1) \wedge (A_2 \Rightarrow B_2) \vdash (A_1 \wedge B_1) \vee (A_2 \wedge B_2).$$