

Assignment 01 of I2ML-s23

Use natural deduction to prove the validity of the following sequents:

1. $p \vee q \vdash q \vee p$
2. $(p \wedge q) \wedge r \vdash p \wedge (q \wedge r)$
3. $p \rightarrow q \vdash \neg q \rightarrow \neg p$
4. $(p \wedge q) \vee (p \wedge r) \vdash p \wedge (q \vee r)$
5. $\vdash \neg p \vee q \rightarrow (p \rightarrow q)$
6. $\vdash (p \rightarrow q) \rightarrow \neg p \vee q$
7. $\neg(p \rightarrow q) \vdash q \rightarrow p$
8. $W \rightarrow X, Y \rightarrow Z \vdash W \vee Y \rightarrow X \vee Z$
9. $\vdash \neg(A \wedge B) \rightarrow (A \rightarrow \neg B)$
10. $p \wedge q \rightarrow r \vdash (p \rightarrow r) \vee (q \rightarrow r)$
11. $\vdash \neg(A \leftrightarrow \neg A)$
12. $A \leftrightarrow B \vdash \neg A \leftrightarrow \neg B$