

Homework 5

Mathematical foundations of informatics (I201, 2008)

Instructor: Tang

(This HW will be collected on 10/8 Wed. in the class. Write LEGIBLY and explain your answers clearly. The homework you hand in must be your own work, IN YOUR OWN WORDS and your own explanation. **NO late homework will be accepted.**)

1. (50 pts) Give natural deduction proofs for the following sequents.

- a. $A, A \rightarrow B, B \rightarrow C \vdash A \wedge C$
- b. $A \rightarrow B \vdash A \rightarrow B$
- c. $\vdash A \rightarrow (B \rightarrow A)$
- d. $A \wedge B \rightarrow (C \wedge D), A \vdash B \rightarrow D$
- e. $A \rightarrow (B \rightarrow C) \vdash (A \wedge B) \rightarrow C$
- f. $A \wedge \neg B \vdash \neg(A \wedge B)$
- g. $(A \wedge B) \rightarrow C \vdash A \rightarrow (B \rightarrow C)$
- h. $A \rightarrow B \vdash \neg B \rightarrow \neg A$
- i. $A \rightarrow B, \neg B \vdash \neg A$
- j. $A, A \rightarrow C, C \rightarrow (D \wedge E) \vdash E$