September 21 — Miscellaneous remarks about proof

1. Proofs by contradiction and proofs by contraposition.


3. Example proof of \( \neg P \lor \neg Q \) from \( \neg (P \land Q) \).

4. Definitions (the first is in LPL, the second is not):

   **Definition 1** Suppose that \( X \) is a set of formulas and \( S \) a formula. If there is a proof of \( S \) in \( \mathcal{F}_T \) from premises in \( X \) we write \( X \vdash_T S \).

   **Definition 2** Suppose that \( X \) is a set of formulas and \( S \) a formula. If \( S \) is a tautological consequence of the formulas in \( X \) we write \( X \models_T S \).

5. The following Theorem occupies early next week.

   **Theorem 1** Suppose that \( X \) is a set of formulas and \( S \) a formula. Then \( X \vdash_T S \) iff \( X \models_T S \).

6. Infinite hypothesis sets (for \( \vdash_T \) and \( \models_T \)).

**Homework**

- Read notes Section 2.4.
- Do problems 2.4.1,4,5 in the Notes.