

First-order logic calculi - lab exercises

Computational Logic

March 16, 2010

1 Resolution

We know that:

A student will not pass the exam whenever (s)he is anxious and does not study.

Use resolution to check whether following arguments are valid.

1. Some students are anxious. Some students study. Therefore, no student will pass the exam.
2. Some students are anxious. Some students study. Therefore, some students will pass the exam.
3. Some students are anxious. All students study. Therefore, all students will pass the exam.

2 Tableaux

Determine if the following arguments are valid using tableaux.

1. All fruit is tasty if it is not cooked. This apple is not cooked. Therefore, it is tasty.
2. Dilly loves all and only those who love Milly. Milly loves all and only those who do not love Dilly. Dilly loves herself. Therefore, Milly loves herself.

3 Natural deduction

Prove with natural deduction that

$$(\exists X(F \rightarrow G)) \vdash ((\forall XF) \rightarrow G)$$

is valid for all formulas F, G such that G does not contain a free occurrence of X .