Theorem Proving and Equality

Exercise 35 *In the refutation completeness proof of $\mathcal{H}$ (Theorem 4), we use the argument from the proof of the refutation completeness of $\mathcal{G}$ (Lemma 7). Expand these shortcuts in the proof of Theorem 4, so that there is no reference to Lemma 7.*

For example we say in the case 2:

By the argument in Lemma 7, from the assumption that $C\gamma$ is a minimal ground counterexample and instance of a clause in S, we know that there is a superposition right inference step ...

A similar reference to Lemma 7 is in case 4 of this proof.

Exercise 36 *Use file "example6" from the web-page of the lecture and feed it to Otter.*

1. *Notice which flags are set automatically to obtain superposition inferences.*
2. *Compare the list of usable and the list of demodulators printed out at the end. What is your conclusion if they are the same (except for $x = x$ in the list of usable?*
3. *Now reverse the precedence in lex() and feed it again to otter. Compare the lists of usable and of demodulators again. What are your conclusions?*
4. *Change the precedence of symbols in an arbitrary way and observe the behaviour of the completion process in Otter.*
5. *Using the result of completion, decide if* $f(g(f(g(x, h(x))), h(c))) \approx g(h(f(g(h(x), x))), c)$ *in the equational theory defined in "example6".*
6. *Experiment with file "example7" in a similar way.*