Discussion minutes: UConn Logic Group: October 3, 2008

provided by Matt Clemens (matthew.clemens@uconn.edu)

The session consisted of a presentation by Reed on Continuous Logic

The following points were raised in discussion:

1.) Lionel asked (in response to Reed's claim that one needed continuous logic in order to take *sups* and *infs* in a logic) why a two-sorted logic would not suffice.

> Reed answered that the notions of *sup* and *inf* are not first order definable. Further, if a two-sorted first order logic is used, this will yield nonstandard models of the [0,1] part of the model in which not all nonempty subsets have *sups* and *infs*.

2.) Jc asked if the defect noted above also applies to non-standard models of arithmetic.

> Reed answered that in a nonstandard model of arithmetic, there are extra elements which are greater than all standard natural numbers. In the case at hand, the worry is that the nonstandard model of [0,1] is too small. That is, it is missing some elements from the standard model - namely, it is missing some of the *sups* and *infs*.

3.) Heidi asked if the domain in continuous logic could be a domain of 1 pt. Reed confirmed that it could. Heidi then clarified that the domain need only be non-empty, which Reed confirmed.

4.) Lionel asked why d was not included in the function symbols of the semantics of the logic.

> Reed answered that d is actually a relation symbol and not a function symbol.
>
> Lionel clarified then that no sentence such as $d(x, y) = 0$ would be in the language.
>
> Reed affirmed this clarification.

5.) William asked for clarification of d as a relation, in comparison with a truth value assignment in $Ł_{\aleph}$.

> Reed replied that they were analogous only in that each is an assignment.

6.) Tyler asked whether there could be countably infinite connectives which would allow us to have a finite set of connectives that captured all of the uniformly continuous connectives on [0,1] exactly, as opposed to within a specified ϵ.

> Reed answered that he wasn't sure, but that one couldn't capture the uniformly continuous connectives exactly with just a finite number of finite connectives for cardinality reasons.

7.) In response to Reed explaining a bit about register machines with oracles, Heidi asked if the oracle could be the set of numbers X for which the machine halts.

> Reed confirmed that indeed it could.