LOGIKSEMINARIET STOCKHOLM–UPPSALA

Bas Spitters (Nijmegen)

Constructive functional analysis

(Partially joint work with Thierry Coquand.) A common misconception about constructive mathematics (in the sense of Brouwer, Bishop or Martin-Löf) is that it would not be powerful enough for the applications of mathematics. In fact, this was the Weyl's contention. We will indicate how functional analysis and integration theory, which constitute a large part of mathematical physics, can be developed constructively. In this process we will emphasize an observational account of mathematics, which is natural in functional analysis. This observational viewpoint helps to limit the use of the axiom of (countable) choice.

Finally, we will give an application of this theory to one of Weyl's important contributions to mathematical physics, the Peter–Weyl theorem. This proof uses proof-theoretical methods instead of the usual set-theoretical ones.

This talk is accessible to both logicians and analysts.

Onsdag kl 10.30–12.15, sal 2214, MIC, Polacksbacken, Uppsala.

Thierry Coquand (Chalmers)

A completness proof for coherent logic

The notion of dynamical proof comes from the work of Coste–Lombardi–Roy in constructive algebra, and it can be seen as a special case of the tableau method as presented for instance in Smullyan's book on first-order logic. Using this notion, we refine the usual construction of the classifying site of a first-order coherent theory. The conditions become finite presentation of models while the morphisms are inclusion and renaming.

We use this construction to give a direct proof of consistency of the theory of algebraically closed fields, which does not rely on quantifier elimination. We show also how these notions illuminate Skolem's 1920 treatment of plane projective geometry.

Onsdag kl 14.00–15.00, sal 3513, MIC, Polacksbacken, Uppsala.