

ALGEBRA SEMINAR

GROUPS, RINGS, LOGIC.

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Abstract

In group theory, interesting statements about a group usually can't be expressed in the language of first-order logic. It turns out, however, that some groups can actually be determined by their first-order properties, or, even more strongly, by a single first-order sentence. In the latter case the group is said to be *finitely axiomatizable*.

I will describe some examples of this phenomenon (joint work with A. Nies and K. Tent). One family of results concerns axiomatizability of p -adic analytic pro- p groups, within the class of all profinite groups.

Another main result is that for an adjoint simple Chevalley group of rank at least 2 and an integral domain R , the group $G(R)$ is *bi-interpretable* with the ring R . This means in particular that first-order properties of the *group* $G(R)$ correspond to first-order properties of the *ring* R . As many rings are known to be finitely axiomatizable we obtain the corresponding result for many groups; this holds in particular for every finitely generated group of the form $G(R)$.