Séminaire de théorie des nombres

Le 7 novembre à 14h

Model Theory of the Witt Frobenius, with Emphasis on an Ax-Kochen- Ersov Principle

Exposé de Angus MacIntyre

Résumé : We consider the Witt vectors over an algebraically closed field, with the extra structure of the Witt Frobenius map . Thus, the Witt vectors are seen as a difference ring, and we study the structure of sets definable in this difference ring. A similar enterprise has been useful for diophantine geometry in the case of algebraically closed fields with automorphism (whose model theory has been used by Hrushovski in connection with Manin-Mumford). But here the analysis has a different flavour, because of the lifting of an automorphism of the residue field. So the work is in fact a very broad generalization of the Ax-Kochen-Ersov work from the 1960's (since in our case the fixed ring is the ring of p-adic integers). The 1960's work, and its elaboration by others, was useful first in connection with a problem of Artin, and later in connection with p-adic ,and ultimately motivic, integration. We give analogues of most of the results of Ax-Kochen Ershov in the Witt Frobenius setting, including decidability results, quantifier-eliminations in Pas style, passage to characteristic zero from finite characteristic residue field, and some uniformity in p. I will give special attention to the analogue of the Ax-Kochen-Ershov principle that in the limit the p-adics and the power series over the prime field are the same.

This is joint work with Belair and Scanlon.