Model Theory of Frobenius on Witt Vectors

Angus Macintyre

Joint work with L.Belair and T.Scanlon.

I will describe an approach, basically along the lines of Ax-Ershov-Kochen, to the model theory of the rings W[k], where k is a perfect field of finite characteristic, augmented with the important lifting of Frobenius. Under some natural restrictions on k (restrictions which are irrelevant in the original purely field-theoretic work) one can obtain exact analogues of the classical transfer theorems, quantifier eliminations, and decidability results. But for this one needs to develop a much more refined theory of pseudoconvergence, and henselization in the category of valued difference fields. Our results in the above setting involve the formalism of p-derivations. But we develop also an extensive theory of general valued difference fields without any analogue of p-derivations, and obtain in particular an analogue of the classical work relating p-adic fields and power series over finite fields.

We pay attention, too, to uniformity in p.

Address:
E-mail: angus@maths.ed.ac.uk