# Model theory of the field of $p$-adic numbers - IPM workshop
# References - Arthur Forey

## Model theory of $\mathbb{Q}_p$

- Denef's paper on cell decomposition and quantifier elimination in Macintyre's language.
  J. Denef. P-adic semi-algebraic sets and cell decomposition. *Journal für die reine und angewandte Mathematik (Crelles Journal)*, 369:154–166, 1986.

- His original proof of the cell decomposition and application to rationality.
  J. Denef. The rationality of the Poincaré series associated to the p-adic points on a variety. *Invent. Math.*, 77:1–23, 1984.

- Existence of Skolem functions (the proof is different from the one given in the lectures).
  L. van den Dries. Algebraic theories with definable Skolem functions. *J. Symbolic Logic*, 49(2):625–629, 1984.

- Structure of definable sets in $\mathbb{Q}_p$ : analytic cell decomposition, curve selection lemma, dimension theory.
  P. Scowcroft and L. van den Dries. On the structure of semialgebraic sets over p-adic fields. *J. Symbolic Logic*, 53(4):1138–1164, 1988.

- For dimension theory, see also this paper, that gives a general theory for "well-behaved" dimension.
  L. Van den Dries. Dimension of definable sets, algebraic boundedness and Henselian fields. *Annals of Pure and Applied Logic*, 45(2, Part 1):189–209, Dec. 1989.

## Uniform theory

- Pas' paper on uniform cell decomposition and applications to rationality.
  J. Pas. Uniform p-adic cell decomposition and local zeta functions. *J. Reine Angew. Math.*, 399:137–172, 1989.

- The original papers by Ax-Kochen and Eršov.
  J. Ax and S. Kochen. Diophantine problems over local fields. I. *Amer. J. Math.*, 87:605–630, 1965.
  J. L. Eršov. On elementary theories of local fields (Russian). *Algebra i Logika Sem.*, 4(2):5–30, 1965.

- Cluckers-Loeser's theory of motivic integration, relying on Pas' cell decomposition.
  R. Cluckers and F. Loeser. Constructible motivic functions and motivic integration. *Invent. Math.*, 173(1):23–121, 2008.

## Other

- A general survey of the model theory of $p$-adics numbers, covering many topic omitted in those lectures (subanalytic sets, definable groups, $p$-minimality...). It covers the period from Denef's cell decomposition result up to 2013.
  L. Bélair. Panorama of $p$-adic model theory. *Ann. Sci. Math. Québec*, 36(1):43–75 (2013), 2012.

- For a survey of results precedding Denef's theorem, see also
  A. Macintyre. Twenty years of $p$-adic model theory. In *Logic Colloquium '84 (Manchester, 1984)*, volume 120 of *Stud. Logic Found. Math.*, pages 121–153. North-Holland, Amsterdam, 1986.