

THESIS ABSTRACTS

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MADELINE G. BARNICLE, *Uniform Properties of Ideals in Rings of Restricted Power Series*, University of California, Los Angeles, USA, 2019. Supervised by Matthias Aschenbrenner. MSC: 11D88, 13L05. Keywords: model theory, p -adic numbers, definability, prime ideals, radical ideals, Weierstrass Division.

Abstract

When is an ideal of a ring radical or prime? By examining its generators, one may in many cases definably and uniformly test the ideal's properties. We seek to establish such definable formulas in rings of p -adic power series, such as $\mathbb{Q}_p\langle X \rangle$, $\mathbb{Z}_p\langle X \rangle$, and related rings of power series over more general valuation rings and their fraction fields. We obtain a definable, uniform test for radicality, and, in the one-dimensional case, for primality. This builds upon the techniques stemming from the proof of the quantifier elimination results for the analytic theory of the p -adic integers by Denef and van den Dries, and the linear algebra methods of Hermann and Seidenberg.

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OSVALDO GUZMÁN GONZÁLEZ, *P-points, MAD families and Cardinal Invariants*, Centro de Ciencias Matemáticas, UNAM, Morelia, Michoacan, Mexico, 2017. MSC: Primary 03E17, 03E35. Secondary 03E65. Keywords: P-points, MAD families, $+$ -Ramsey, Silver model, cardinal invariants.

Abstract

The main topics of this thesis are cardinal invariants, P -points and MAD families. *Cardinal invariants of the continuum* are cardinal numbers that are bigger than \aleph_0 and smaller or equal than c . Of course, they are only interesting when they have some combinatorial or topological definition. An *almost disjoint family* is a family of infinite subsets of ω such that the intersection of any two of its elements is finite. A MAD family is a maximal almost disjoint family. An ultrafilter \mathcal{U} on ω is called a *P-point* if every countable $\mathcal{B} \subseteq \mathcal{U}$ there is $X \in \mathcal{U}$ such that $X \setminus B$ is finite for every $B \in \mathcal{B}$. This kind of ultrafilters has been extensively studied, however there is still a large number of open questions about them.