SCH. This generalizes the main result of [3] in two senses: it allows arbitrary cofinalities for κ and arbitrary failures for the SCH.

In the last part of the dissertation (Part III) we introduce the notion of Σ-Prikry forcing. This new concept allows an abstract and uniform approach to the theory of Prikry-type forcings and encompasses several classical examples of Prikry-type forcing notions, such as the classical Prikry forcing, the Gitik-Sharon poset, or the Extender Based Prikry forcing, among many others.

Our motivation in this part of the dissertation is to prove an iteration theorem at the level of the successor of a singular cardinal. Specifically, we aim for a theorem asserting that every κ^{++}-length iteration with support of size $\leq \kappa$ has the κ^{++}-cc, provided the iterates belong to a *relevant* class of κ^{++}-cc forcings. While there are a myriad of works on this vein for regular cardinals, this contrasts with the dearth of investigations in the parallel context of singular cardinals. Our main contribution is the proof that such a result is available whenever the class of forcings under consideration is the family of Σ-Prikry forcings. Finally, and as an application, we prove that it is consistent—modulo large cardinals—the existence of a strong limit cardinal κ with countable cofinality such that SCH_κ fails and every finite family of stationary subsets of κ^+ reflects simultaneously.

[1] J. Bagaria, $C^{(n)}$*-cardinals*. ***Archive for Mathematical Logic***, vol. 51 (2012), no. 3–4, pp. 213–240.

[2] M. Magidor, *How large is the first strongly compact cardinal*? *Or a study on identity crises*. ***Annals of Mathematical Logic***, vol. 10 (1976), no. 1, pp. 33–57.

[3] D. Sinapova, *The tree property at the first and double successors of a singular*. ***Israel Journal of Mathematics***, vol. 216 (2016), no. 2, pp. 799–810.

Abstract prepared by Alejandro Poveda.
E-mail: alejandro.poveda@mail.huji.ac.il
URL: https://www.researchgate.net/publication/346097133_Contributions_of_the_theory_of_large_cardinals_through_the_method_of_Forcing

Pierre Touchard, ***Transfer Principles in Henselian Valued Fields***, Westfälische Wilhelms-Universität Münster, Germany, 2020. Supervised by Martin Hils. MSC: Primary 03C45, 03C60, Secondary 12J10. Keywords: model theory of valued fields, classification theory, stable embeddedness.

Abstract

In this thesis, we study transfer principles in the context of certain Henselian valued fields, namely Henselian valued fields of equicharacteristic 0, algebraically closed valued fields, algebraically maximal Kaplansky valued fields, and unramified mixed characteristic Henselian valued fields with perfect residue field. First, we compute the burden of such a valued field in terms of the burden of its value group and its residue field. The burden is a cardinal related to the model theoretic complexity and a notion of dimension associated to NTP_2 theories. We show, for instance, that the Hahn field $\mathbb{F}_p^{\mathrm{alg}}((\mathbb{Z}[1/p]))$ is inp-minimal (of burden 1), and that the ring of Witt vectors $W(\mathbb{F}_p^{\mathrm{alg}})$ over $\mathbb{F}_p^{\mathrm{alg}}$ is not strong (of burden ω). This result extends previous work by Chernikov and Simon and realizes an important step toward the classification of Henselian valued fields of finite burden. Second, we show a transfer principle for the property that all types realized in a given elementary extension are definable. It can be written as follows: a valued field as above is stably embedded in an elementary extension if and only if its value group is stably embedded in the corresponding extension of value groups, its residue field is stably embedded in the corresponding extension of residue fields, and the extension of valued fields satisfies a certain algebraic condition. We show, for instance, that all types over the power series field $\mathbb{R}((t))$ are definable. Similarly, all types over the quotient field of $W(\mathbb{F}_p^{\mathrm{alg}})$ are definable. This extends previous work of Cubides and Delon and of Cubides and Ye.

These distinct results use a common approach, which has been developed recently. It consists of establishing first a reduction to an intermediate structure called the leading term structure, or RV-sort, and then of reducing to the value group and residue field. This leads us to develop similar reduction principles in the context of pure short exact sequences of abelian groups.

Abstract prepared by Pierre Touchard.
E-mail: pierre.pa.touchard@gmail.com
URL: https://miami.uni-muenster.de/Record/a612cf73-0a2f-42c4-b1e4-7d28934138a9

TINGXIANG ZOU, ***Pseudofinite Structures and Counting Dimensions,*** Université de Lyon, Lyon, France, 2019. Supervised by Frank Wagner. MSC: 03C20. Keywords: pseudofinite structure, pseudofinite counting dimension, H-structure, pseudofinite difference field, primitive permutation groups, approximate subgroup.

Abstract

The thesis *pseudofinite structures and counting dimensions* is about the model theory of pseudofinite structures with the focus on groups and fields. The aim is to deepen our understanding of how pseudofinite counting dimensions can interact with the algebraic properties of underlying structures and how we could classify certain classes of structures according to their counting dimensions. Our approach is by studying examples. We treat three classes of structures: The first one is the class of H-structures, which are generic expansions of existing structures. We give an explicit construction of pseudofinite H-structures as ultraproducts of finite structures. The second one is the class of finite difference fields. We study properties of coarse pseudofinite dimension in this class, show that it is definable and integer-valued and build a partial connection between this dimension and transformal transcendence degree. The third example is the class of pseudofinite primitive permutation groups. We generalise Hrushovski's classical classification theorem for stable permutation groups acting on a strongly minimal set to the case where there exists an abstract notion of dimension, which includes both the classical model theoretic ranks and pseudofinite counting dimensions. In this thesis, we also generalise Schlichting's theorem for groups to the case of approximate subgroups with a notion of commensurability.

Abstract prepared by Tingxiang Zou.
E-mail: tzou@uni-muenster.de
URL: https://tel.archives-ouvertes.fr/tel-02283810/document