

- ▶ ANTON FERNÁNDEZ, *Classifying the KPI-provably total set-recursive functions*.
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The main result of this talk provides a classification of the total set-recursive functions of the set theory KPI and of the two weaker versions KPI' and W-KPI. We also show that, fixing the length of the proof and restricting the provably total functions accordingly, we can prove within the theories the conclusions of the respective classification theorems.

The theory KP, for Kripke-Platek, is a weak subtheory of ZFC, obtained by dropping the Power-Set Axiom and restricting the schemes of Separation and Collection to Δ_0 -formulas. Transitive set models of KP, called admissible set, have a great importance in higher recursion theory. Our main theory, KPI, for Kripke-Platek-limit, axiomatizes the existence of unboundedly many admissible sets in the universe, which is thus a limit of admissibles. Our two subtheories KPI' and W-KPI are obtained by weakening the axiom of foundation in KPI to set-foundation and to full foundation restricted to the natural numbers respectively.

In [2], the authors classified the total Σ_1 -definable set functions of KP. We extend this result to a classification of the total set-recursive functions of the three mentioned theories. In our case, KPI proves the totality of some $\Sigma - 1$ -definable functions which cannot be effectively described. Thus, we need to consider rather set-recursive functions, which makes the definability condition uniform in any admissible set due to Van de Wiele's Theorem ([3]), therefore avoiding the aforementioned issue.

To prove such classifications results, we make use of a relativized ordinal analysis of the theories.

Lastly, we show that the functions used for the classification result for KPI are in fact an optimal bound (similarly for KPI' and W-KPI).

This is joint work with Juan P. Aguilera and Joost J. Joosten.

[1] W. BUCHHOLZ, *A new system of proof-theoretic ordinal functions*, *Annals of Pure and Applied Logic*, vol. 32 (1986), pp. 195–207.

[2] J. COOK AND M. RATHJEN, *Classifying the total set functions of Kp and Kp(P)*, *Journal of Logics and their applications*, vol. 3 (2016), no. 4, pp. 681–753.

[3] J. VAN DE WIELE, *Recursive dilators and generalized recursions*, *Proceedings of the Herbrand symposium*, vol. 107 (1982), pp. 325–332.