Weak cuts in models of PA

Athar Abdul-Quader

Strong cuts play an important role in the model theory of arithmetic, dating back to work by Kirby and Paris on independence results [2] [3]. In this talk we study cuts satisfying weaker properties of cuts which have arisen in various ways. First, we study *separable* cuts, which arose in [1] as those cuts I in countable recursively saturated models of PA for which there exist truth predicates T that are correct for disjunctions of the form $\bigvee_c(0 = 1)$ for any $c \in I$. We compare these with *rational* and *superrational* cuts studied in [4] in connection with the automorphism group of models of PA. We study the arithmetical properties of these cuts, as well as those studied by Kirby and Paris in [2] and [3]. We close with some open questions about cuts definable from truth predicates in countable, recursively saturated models of PA.

[1] Abdul-Quader, Athar and Łełyk, Mateusz, *Pathologies in satisfaction classes*, Annals of Pure and Applied Logic, vol. 175 (February 2024), n^o 2.

[2] Kirby, L.A.S., *Initial segments of models of arithmetic*, Ph.D. thesis. University of Manchester (1977).

[3] Kirby, L.A.S and Paris, J.B., *Initial segments of models of Peano's axioms*, Lecture Notes in Mathematics vol. 619 (1977), pp. 211–216.

[4] Kossak, Roman, *Models with the ω property*, The Journal of Symbolic Logic vol. 54 (March 1989), n^o. 1, pp. 177–189.