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Cardinal characteristics of ω_1

Joint work with Geoff Galgon

The study of cardinal invariants at uncountable cardinals has progressed rapidly in recent years with many surprising results. In this talk, we focus on invariants of a slightly different flavor, which are connected with the combinatorics of ω_1 and of the continuum. Following suggestions of Thilo Weinert, we are especially interested in such invariants which take an ordinal parameter.

For example, the stick number is the least size of a family of infinite subsets of ω_1 so that every uncountable subset of ω_1 contains a member of the family as a subset. This definition can be modified to demand that every member of the family has order-type at least γ, where γ is a fixed countable ordinal.

The definition of the stick number can also be modified in another way, so that we only demand that every uncountable subset of ω_1 intersects a member of the family in an infinite set, and we can further modify this definition to demand that every member of the family has order-type at most γ.

We show that these modifications lead to new cardinal invariants, compute them in certain models of set theory, and demonstrate their relationships with other previously-studied quantities.

[1] Chen, William, Variations of the stick principle. European Journal of Mathematics, Vol. 3 No. 3 (2017), 650–658.

[2] Chen, William, Galgon, Geoff, Antichains, the stick principle, and a matching number. preprint.