On the Zil'ber Principle for Structures Definable in O-minimal Models

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Let $\mathcal{M}$ be a fixed o-minimal model, and $\mathcal{N}$ - a structure definable in $\mathcal{M}$ (i.e. the universe of $\mathcal{N}$ is a definable subset of $\mathcal{M}$ and all basic relations and functions of $\mathcal{N}$ are definable in $\mathcal{M}$).

A general question one can ask is whether the Zil'ber principle holds for such $\mathcal{N}$.

In this talk we will discuss mainly the following part of the Zil'ber principle (so called "purity"):
If $\mathcal{M}$ is an expansion of a field then every $\mathcal{M}$-definable set is definable in the pure field language.

This part of the Zil'ber principle, does not hold in general. For example, $\mathbb{R}_{an}$, the expansion of the field of reals by restricted analytic functions, is a proper expansion of the field of reals.

However we will show that "purity" holds under extra assumption that $\mathcal{M}$ is stable.

From this one can derive another proof of Chow's theorem and also the "purity" principle for the category of compact analytic complex manifolds.

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