

Accepted Manuscript

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Philipp Hieronymi, Travis Nell, Erik Walsberg

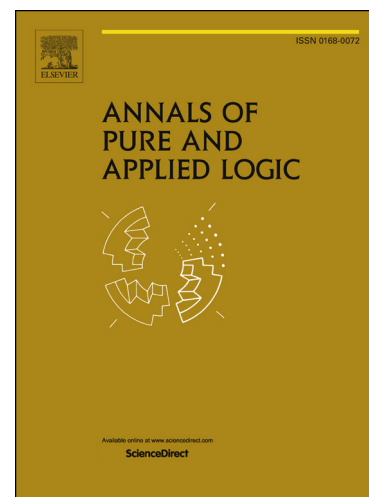
PII: S0168-0072(17)30119-7
DOI: <https://doi.org/10.1016/j.apal.2017.10.002>
Reference: APAL 2606

To appear in: *Annals of Pure and Applied Logic*

Received date: 27 July 2017
Accepted date: 29 September 2017

Please cite this article in press as: P. Hieronymi et al., Wild theories with o-minimal open core, *Ann. Pure Appl. Logic* (2017), <https://doi.org/10.1016/j.apal.2017.10.002>

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WILD THEORIES WITH O-MINIMAL OPEN CORE

PHILIPP HIERONYMI, TRAVIS NELL, AND ERIK WALSBERG

ABSTRACT. Let T be a consistent o-minimal theory extending the theory of densely ordered groups and let T' be a consistent theory. Then there is a complete theory T^* extending T such that T is an open core of T^* , but every model of T^* interprets a model of T' . If T' is NIP, T^* can be chosen to be NIP as well. From this we deduce the existence of an NIP expansion of the real field that has no distal expansion.

1. INTRODUCTION

Let \mathcal{R} be an expansion of a dense linear order $(R, <)$ without endpoints. The **open core** of \mathcal{R} , denoted by \mathcal{R}° , is the structure $(R, (U))$, where U ranges over all open sets of all arities definable in \mathcal{R} . Miller and Speissegger introduced this notion of an open core for expansions of $(\mathbb{R}, <)$ in [16], and established sufficient conditions on \mathcal{R} such that its open core is o-minimal. Here we want to answer the following question:

Is there any restriction on what kind of structures can be interpreted in an expansion of $(R, <)$ with o-minimal open core?

This question, although formulated slightly differently, was already asked by Dolich, Miller and Steinhorn in a preprint version of [7]. Our answer is negative. To give a precise statement of our result, we need to recall the notion of an open core of a theory as introduced in [6]. Let T^* be a theory extending the theory of dense linear orders without endpoints in a language $\mathcal{L}^* \supseteq \{<\}$, and let T be another theory in a language \mathcal{L} . We say that T is an **open core** of T^* if for every $\mathcal{N} \models T^*$ there is $\mathcal{M} \models T$ such that \mathcal{N}° is interdefinable with \mathcal{M} .

Theorem A. Let T be a consistent o-minimal theory extending the theory of densely ordered groups and let T' be a consistent theory. Then there is a complete theory T^* extending T such that

- (1) T^* interprets a model of T' ,
- (2) T is an open core of T^* ,
- (3) T^* is NIP if T' is NIP,
- (4) T^* is strongly dependent if T' is strongly dependent.

Statements (3) and (4) of Theorem A indicate that we can choose T^* in such a way that not only the open core of T^* is o-minimal, but also T^* remains tame in the sense of Shelah's combinatorial tameness notions. For definitions of NIP and

Date: October 10, 2017.

2010 Mathematics Subject Classification. Primary 03C64 Secondary 03C45.

Key words and phrases. O-minimal open core, Tameness, NIP, Distal, Expansions of the real line, Noiseless.

The first author was partially supported by NSF grant DMS-1654725.

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