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Philipp Hieronymi* (p@hieronymi.de), University of Illinois at Urbana-Champaign,
Department of Mathematics, 1409 W. Green Street, Urbana, IL 61801. *Interpreting the projective
hierarchy in expansions of the real line.*

We give a criterion when an expansion of the ordered set of real numbers defines the image of $(\mathbb{R}, +, \cdot, \mathbb{N})$ under a semialgebraic injection. This allows us to answer several questions raised by Chris Miller about expansions of the additive group of real numbers.

Theorem 1 ([1]). Let $\alpha \in \mathbb{R}$ be a non-quadratic irrational number and let $f : \mathbb{R} \rightarrow \mathbb{R}$ be the function that maps x to αx . Then $(\mathbb{R}, <, +, \mathbb{N}, f)$ defines multiplication on \mathbb{R} .

Theorem 2 ([1]). $(\mathbb{R}, <, +, \sin, \mathbb{N})$ defines multiplication on \mathbb{R} .

This is joint with Michael Tychonievich.

References

- [1] P. HIERONYMI, M. TYCHONIEVICH, *Interpreting the projective hierarchy in expansions of the real line*, ***Proceedings of the American Mathematical Society*** (2012) to appear

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