

- ▶ YA'ACOV PETERZIL (JOINT WITH SERGEI STARCHENKO), *Abelian varieties, their moduli spaces and o-minimality*.

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Several classical mathematical constructions involve the action of an infinite discrete group Γ on a complex manifold M . In an o-minimal structure one cannot define infinite discrete sets, therefore it might seem at first that these constructions are beyond the reach of o-minimality. Still, in some important cases there is a definable subset of M which intersects every Γ -orbit in a finite set (so-called a fundamental set) and in these cases one may hope to capture the construction of the quotient space $\Gamma \backslash M$ in an o-minimal structure.

In [1] we investigated in this framework the analytic family of elliptic curves and their definability in the o-minimal structure $\mathbb{R}_{an,exp}$. In this talk I will discuss the construction of families of complex tori, of polarized abelian varieties, and their moduli space within various o-minimal structures (see [2]).

Recent work by Pila-Zannier [4] and by Pila [3] makes use of such constructions in the application of o-minimality to arithmetical problems in algebraic geometry. If time permits I will discuss these ideas as well.

[1] Y. PETERZIL AND S. STARCHENKO, *The definability of the Riemann theta functions, abelian varieties and their moduli space*, **In preparation**,

[2] ———, *Uniform definability of the Weierstrass \wp -functions and generalized tori of dimension one*, **Selecta Mathematica, New Series**, vol. 10 (2004), pp. 525–550

[3] J. PILA, *Rational points of definable sets and results of Andre-Oort-Manin-Mumford type*, **Int. Math. Res. Notices**, no. 13, (2009), pp. 2476–2507.

[4] J. PILA AND U. ZANNIER *Rational points in periodic analytic sets and the Manin-Mumford conjecture*, **Rend. Lincei Mat. Appl.**, 19 (2008), pp. 149–162.