UNIVERSIDADE DE LISBOA
CENTRO DE MATEMÁTICA E APLICAÇÕES FUNDAMENTAIS
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Mês de: Outubro 2010

SEMINÁRIO DE TEORIA DOS MODELOS

Dia 13 de Outubro (quarta-feira), às 15h, na Sala B3-01

"Abelian varieties, complex tori and the definability of restricted Riemann Theta functions"

(joint work with S. Starchenko)

Y'ACOV PETERZIL

(HAIFA UNIVERSITY, ISRAEL)

Abstract:

The motivation for this work is recent progress made by J.Pila on the Andre-Oort conjecture. This conjecture, which is analogous to the Manin-Mumford conjecture, replaces "abelian varieties" by "the moduli space of principally polarized abelian varieites, call it H", "torsion points" by "points in the moduli space corresponding to abelian varieties with so-called complex multiplication" and "abelian subvarieties" by "special subvarieties". Thus, the Andre-Oort conjecture in this setting says that if the CM points on an algebraic subvariety of H are Zariski dense then this variety is special.
So far, the strategy of Pila established unknown cases of the A-O conjecture when the abelian varieties in question are products of elliptic curves. The proof involves nontrivial number theoretic facts together with variants, due to Pila, of the Pila-Wilkie result on the rational points on o-minimal definable sets. In order to obtain the connection to o-minimality one needed to know that certain holomorphic maps such as the J-invariant, and the Weierstrass p-functions are definable in the o-minimal structure R_{an,exp}.
If one hopes to extend the work of Pila to the moduli space of arbitrary abelian varieties, the connection to o-minimality should be
established. This connection is given via the Riemann theta functions, which define the holomorphic map between the analytic description of H and the algebraic one, as well as the map between complex tori and abelian varieites.
The main result we prove is that the restriction of these Riemann theta functions to their natural fundamental domain is definable in
the structure R_{an,exp}
In this talk I will attempt to define the basic notions and explain the theorem. If time permits I will say (very few) words about the
proof.

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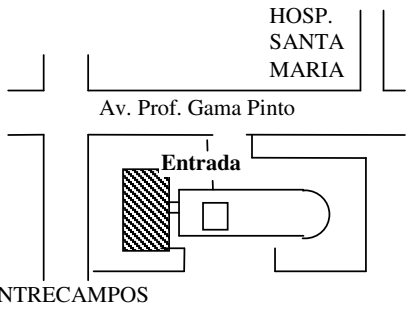

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