Department of Mathematics and Computer Science

Friday, November 14, 2014, 4:10

COLLOQUIUM TALK

Speaker: Philipp Hieronymi

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Old Main 2231

Expansions of the Ordered Additive Group of Real Numbers by Two Discrete Subgroups

Abstract:

Let $a \in \mathbb{R}$. We consider the following structure $\mathcal{R}_a := (\mathbb{R}, <, +, \mathbb{Z}, \mathbb{Z}a)$. Although it is well known that $(\mathbb{R}, <, +, \mathbb{Z})$ has a decidable theory and other desirable model theoretic properties (arguably due to Skolem), the question whether the theory of $\mathcal{R}_a$ is decidable even for some irrational number a has been open for a long time. The interest in these structures arises among other things from the observation that the structure $\mathcal{R}_a$ codes many of the Diophantine properties of a. In this talk, I will show that when a is quadratic, the theory of $\mathcal{R}_a$ is decidable. The proof of this statement depends crucially on the periodicity of the continued fraction expansion of a and combines classical tools from the theory of Diophantine approximations (in particular, Ostrowski representations) with Büchi's celebrated theorem about the decidability of the monadic second order theory of one successor.

SNACKS IN FACULTY LOUNGE AT 3:30 PM.
EVERYONE WELCOME (EVEN IF YOU ARE UNABLE TO ATTEND THE TALK)