Manhattan Algebra Day

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TC^0 computations and the subgroup membership problem in nilpotent groups

Friday, December 9, 2015
CUNY Graduate Center, Room C-201
2:50pm

Abstract:

In recent years, complexity is playing an increasingly important role in algorithmic group theory. Apart from time complexity, other complexity measures like circuit complexity are of particular interest because they allow a more refined classification of problems within polynomial time. The first big result in this direction was due to Lipton and Zalcstein showing that linear groups have word problem in Logspace. Later, Robinson showed that nilpotent groups have word problem in the constant-depth circuit class TC^0 – a subclass of Logspace.

In the first part of the talk I will give a brief survey on circuit complexity in group theory. After that I will show how to solve the (uniform) subgroup membership problem in nilpotent groups in TC^0. The latter problem previously has been showed to be in Logspace by Macdonald, Myasnikov, Nikolaev, and Vassileva.

This talk is based on joint work with Alexei Myasnikov.