



PURDUE UNIVERSITY

Department of Mathematics Colloquium

Speaker: Professor Nikolai Vorobjov, University of Bath, UK
Title: "Complexity Lower Bounds and O-minimal Geometry"
Date: Tuesday, September 1, 2009
Time: 4:30 P.M.
Place: MATH 175

Abstract

It is easy to prove that ordering of n weights using a balance scale requires asymptotically at least $n \log n$ comparisons. On the other hand, the known proof of the same lower bound for a seemingly similar problem, deciding whether or not all weights are pair-wise distinct, requires a difficult topological result due to Milnor and Thom. In the talk I will discuss a general method of proving lower bounds for the computational problem of membership to a semialgebraic set in terms of its total Betti number. A significant progress in this direction was achieved in 90s by Lovasz, Björner, Ben-Or and others, and culminated in a lower bound by Yao for compact semialgebraic sets. Our recent results with Andrei Gabrielov on approximations of definable sets by compact families allow to generalize Yao's theorem to arbitrary semialgebraic sets.

Refreshments will be served in the Math Library Lounge at 4:00 p.m.