



## MANHATTAN ALGEBRA DAY

---

Alexei Ovchinnikov

CUNY

*Algebra, PDEs, and algorithms*

Friday, December 4, 2015  
CUNY Graduate Center, Room 9205-04  
9:30am

*Abstract:*

We will discuss upper and lower bounds for the effective Nullstellensatz for systems of polynomial PDEs. These are uniform bounds for the number of differentiations to be applied to all equations of a system of PDEs in order to discover algebraically whether it is consistent (i.e., has a solution in a differential field extension). The bounds are functions of the degrees and orders of the equations of the system and the numbers of dependent and independent variables in them. Seidenberg was the first to address this problem in 1956. The first explicit bounds appeared in 2009, with the upper bound expressed in terms of the Ackermann function. In the case of one derivation, the first explicit bound is due to Grigoriev (1989). In 2014, another bound was obtained if restricted to the case of one derivation and constant coefficients. Our new result does not have these restrictions.