



THE UNIVERSITY OF CHICAGO

Departments of Mathematics and Statistics
ALGEBRAIC GEOMETRY SEMINAR

Joint Algebraic Geometry/Theory Seminar
(Joint with the Department of Computer Science Theory Group)

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Siegel's Theorem, Edge Coloring, and a Holant Dichotomy

WEDNESDAY, April 2, 2014 from 3:30–4:30 PM

Ryerson 251, 1100 E. 58th Street, Chicago, IL

ABSTRACT

What do Siegel's theorem on finiteness of integer solutions have to do with complexity theory? In this talk we discuss a new complexity dichotomy theorem for counting problems. Such a dichotomy is a classification of a class of problems into exactly two kinds: those that are polynomial time computable, and those that are $\#P$ -hard, and thus intractable. (For logicians, a complexity dichotomy theorem is a kind of restricted anti-Friedberg-Muchnick Theorem.) An example problem in this dichotomy is the problem of counting the number of valid edge colorings of a graph. We will show that an effective version of Siegel's theorem and some Galois theory are key ingredients in the proof of this dichotomy. Along the way we will also meet the Tutte polynomial, medial graphs, Eulerian orientations, Puiseux series, and a certain lattice condition on the (logarithms of) the roots of polynomials with integer coefficients.

Joint work with Heng Guo and Tyson Williams.

Organizers:

For further information on this event, please email Lek-Heng Lim at lekheng@galton.uchicago.edu or Madhav Nori at nori@math.uchicago.edu.

UCAGS Seminar URL: <http://www.stat.uchicago.edu/~lekheng/ag.html>