



THE UNIVERSITY OF CHICAGO

Departments of Mathematics and Statistics
ALGEBRAIC GEOMETRY SEMINAR

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Ranks and Nuclear Norms of Tensors

TUESDAY, January 29, 2013, from 4:30–6:00 PM

312 Eckhart Hall, 5734 S. University Avenue

ABSTRACT

The rank of a matrix generalizes to higher order tensors. There are many applications of the rank of a tensor in applied and pure mathematics. For example, the rank of a certain tensor related to matrix multiplication is closely related to the complexity of matrix multiplication. An important tool in applied math is low rank matrix completion. Matrix completion is the problem of finding missing entries in a low rank matrix. I will explain how the low rank matrix completion problem can be reduced to finding the rank of a certain tensor.

Unfortunately, it is often difficult to determine the rank of higher order tensors. A common simplification is convex relaxation: instead of the rank of a tensor, we may consider its nuclear norm. For many tensors, for which we do not know the rank, we can determine the nuclear norm. Examples are: the matrix multiplication tensor, the determinant, permanent, and the multiplication tensor in group algebras. We also will generalize the notion of the Singular Value Decomposition (at least for some tensors) and find the singular values of some tensors of interest.

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>