Meeting: 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-46-692 **Mikhail I. Ostrovskii*** (ostrovskii@cua.edu), Department of Mathematics, The Catholic University of America, Washington, DC 20906. *Minimal-volume projections of cubes, tilings, and minimal-volume sufficient enlargements for normed linear spaces.* Preliminary report.

A real matrix A with entries 0, 1, and -1 is called *totally unimodular* if all minors of A are equal to -1, 0, or 1. A Minkowski sum of finitely many line segments in a linear space is called a *zonotope*. For a $d \times k$ totally unimodular matrix with columns t_i and real numbers a_i we consider the zonotope in R^d given by $Z = \sum_{i=1}^{k}[-a_i t_i, a_i t_i]$. The set of all zonotopes that are linearly equivalent to zonotopes obtained in this way is denoted by T_d. This class of zonotopes was first studied by P. McMullen (1975), who proved that this class of zonotopes coincides with the class of zonotopes tiling R^d.

Later such zonotopes appeared in a different context. By the *cube* in R^n we mean the set $K := \{x \in R^n : \ |x_i| \leq 1\}$. For a linear subspace L by a *minimum-volume projection* of K in L we mean the image of a linear projection of K in L whose volume is minimal possible. The author proved (2003) that a zonotope is in T_d if and only if it is linearly equivalent to a minimum-volume projection of a cube in a d-dimensional subspace.

The purpose of the talk is to show that the class T_d also appears in characterization of minimum-volume sufficient enlargements for normed linear spaces. (Received September 27, 2004)