Combinatorics Seminar

Friday November 30, 2012 at 2PM

Room MS.03

Matthias Lenz

(University of Oxford)

Interpolation, box splines, and lattice points in zonotopes

Given a finite list of vectors $X \subseteq \mathbb{R}^d$, one can define the box spline B_X. Box splines are piecewise polynomial functions that are used in approximation theory. They are also interesting from a combinatorial point of view and many of their properties solely depend on the structure of the matroid defined by the list X.

The support of the box spline is a certain polytope called zonotope $Z(X)$. We will show that if the list X is totally unimodular, any real-valued function defined on the set of lattice points in the interior of $Z(X)$ can be extended to a function on $Z(X)$ of the form $p(D)B_X$ in a unique way, where $p(D)$ is a differential operator that is contained in the so-called internal P-space. This was conjectured by Olga Holtz and Amos Ron.

The talk will focus on combinatorial aspects and all objects mentioned above will be defined. (arXiv:1211.1187)