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## Perpendicular Dissections of Euclidean Space, With Gain Graphs

### Abstract for the Combinatorics and Number Theory Seminar 2000 November 1

Given  $n$  reference points in real  $d$ -space, we specify a finite set of hyperplanes that are perpendicular to lines that join pairs of the  $n$  points. These hyperplanes dissect the space into a number of regions which is determined by the intersection semilattice of the hyperplanes. The semilattice in turn is, for generic reference points, determined by  $d$  and the lift matroid of a gain graph that corresponds to the specifications of the hyperplanes.

Examples include the "braid arrangements" and their affine deformations, that have lately attracted interest in some quarters.

Dissections of this kind arise from generalizing a problem in geometric voting theory. I will discuss some particular examples of possible interest for voting.

The talk will to a great extent depend on pictures and will not assume any knowledge of weird technical machinery.

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