Geometry Seminar
December 3, 2002, Tuesday, 6:00 p.m.
Room 613, Courant Institute
251 Mercer Street, New York

LP-orientations of cubes and crosspolytopes

Mike Develin
University of California, Berkeley

Abstract

Given a combinatorial d-polytope P and an orientation on its graph, we may ask the following question: Does there exist a realization of $P \subset \mathbf{R}^d$ and a linear functional f such that f induces the given orientation on the graph of P? Holt and Klee introduced a set of necessary conditions on the orientation for it to be a so-called LP-orientation; we show that for cubes, these conditions are very insufficient in the sense that the proportion of Holt-Klee orientations of the d-cube which are LP-orientations goes rapidly to 0 as d gets large. For cross-polytopes, we give a strengthening of the Holt-Klee conditions which is both necessary and sufficient for an orientation to be LP.

For further information contact {pach,pollack}@cims.nyu.edu, or visit our website: http://www.math.nyu.edu/seminars/geometry_seminar.html