

Helly type theorems for Leray complexes

Roy Meshulam*

Abstract

Helly's theorem asserts that if a finite family of convex sets in d -space satisfies the condition that every subfamily of cardinality at most $d + 1$ has a non-empty intersection, then the whole family has a non-empty intersection.

The notion of Leray complexes arises naturally in the study of topological extensions of Helly's theorem and its relatives. We'll discuss two results for Leray complexes with the following geometrical and algebraic applications:

- 1) A topological extension of the Lovász colorful Helly theorem (conjectured by Bárány).
- 2) A proof of Terai's conjecture on the regularity of monomial ideals.

Joint work with Gil Kalai.

*Technion - Israel Institute of Technology, Haifa, Israel; Institute for Advanced Study, Princeton, New Jersey;
E-mail: meshulam@math.technion.ac.il