

MSC SEMINAR: D -COLLAPSIBILITY AND ITS APPLICATIONS

A classical result of Helly asserts that if $\mathcal{K} = \{K_1, \dots, K_n\}$ is a finite family of convex sets in \mathbb{R}^d such that $\bigcap_{i \in I} K_i \neq \emptyset$ for all $I \subset [n]$ of cardinality $|I| \leq d+1$, then $\bigcap_{i=1}^n K_i \neq \emptyset$. Helly's theorem and its many extensions and generalizations form a central area of study in discrete geometry and its applications. A key ingredient that plays an important role in a variety of Helly type theorems is the notion of d -collapsibility.

In this talk we will define d -collapsibility as a d -dimensional extension of the notion of chordality in graphs. Following the review of some basic definitions and examples, we will present a number of results we obtained concerning the combinatorics of d -collapsible complexes. These include estimates on the collapsibility of intersections, union and joins of complexes. We conclude our talk by relating d -collapsibility to an old result by Vorob'ev concerning consistent measures and their extensions.