

Colorful results in Combinatorial convexity

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Classical theorems of Helly and Carathéodory are foundational to modern Combinatorial Convexity. *Helly's celebrated theorem* asserts that if any subfamily of up to $d+1$ convex sets in \mathbb{R}^d shares a common point, then all sets in the family intersect at least at one point.

Carathéodory's theorem stipulates that if a point lies within the convex hull of a subset S of \mathbb{R}^d , then it can be found in the convex hull of at most $d+1$ points from S .

These cornerstones have inspired numerous extensions and generalizations. We will discuss the colorful variants of these theorems, including the now-classical Colorful Helly theorem by Lovász and the Colorful Carathéodory theorem by Bárány, as well as their implications and applications in the field.

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