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Realization Spaces of Arrangements of Convex Bodies

Abstract for the Combinatorics Seminar 2015 October 13

In this talk I will define combinatorial types of arrangements of convex bodies, extending order types from point sets to arrangements of convex bodies, and study their realization spaces. Our main results witness a trade-off between the combinatorial complexity of the bodies and the topological complexity of their realization space. On one hand, we show that every combinatorial type can be realized by an arrangement of convex bodies and (under mild assumptions) its realization space is contractible. On the other hand, we prove a universality theorem that says that the restriction of the realization space to arrangements of convex polygons with a bounded number of vertices can have the homotopy type of any primary semialgebraic set. This is joint work with Andreas Holmsen and Alfredo Hubard.
