Abstract:
We give an overview of recent progress in the research of hypergraph jumps -- a problem from extremal combinatorics.
The number $\alpha \in [0, 1)$ is a jump for r if for any $\epsilon > 0$
and any integer $m \ge r$ any r-graph with $N > N(\epsilon, m)$ vertices
and at least $(\alpha + \epsilon) {N \choose r}$ edges
contains a subgraph with m vertices and at least $(\alpha + c) {m \choose r}$ edges,
where $c := c(\alpha)$ does depend only on α.
Baber and Talbot \cite{Baber} recently gave first examples of jumps for $r = 3$ in the interval $[2/9, 1)$.
Their result uses the framework of flag algebras \cite{Raz07} and involves solving a semidefinite optimization problem.
A software implementation of their method is a part of this work.