

Algebraic techniques for combinatorial geometry: Recent developments

Micha Sharir, Tel Aviv University

In the past six years combinatorial geometry has experienced a major revolution, following the introduction of tools from algebraic geometry by Guth and Katz in 2008 and 2010. In the most exciting accomplishment of the new techniques, Guth and Katz have almost settled Erdős's problem on distinct distances in the plane, but many other significant developments have taken place since then. Many old problems have been solved, many improved bounds have been obtained, and the landscape of the field has considerably changed.

In this talk I will survey the recent developments. They include new bounds for other variants of the distinct distances problem, new bounds for incidences in various contexts, and re-examination of the theory of Elekes, Rónyai, and Szabó on polynomials vanishing on grids, and numerous applications thereof.