
SHAH RASHAN ZAMIR, Tulane University

On the algebraic properties of the Böröczky configuration

The Böröczky configuration of lines and (multiple) points exhibits extremal behavior in commutative algebra and combinatorics. Examples of this appear in the context of the containment problem for ordinary and symbolic powers of ideals and the proof of the Dirac-Motzkin conjecture by Green and Tao. This paper studies the algebraic properties of Böröczky configurations of arbitrary size. Our results compute the Waldschmit constant of the defining ideal of these configurations. Moreover, we use the weighted projective plane $P(1,2,3)$ to give an upper bound for the degree of the minimal generators of their ideal. Finally, this construction is applied to an elliptic curve in the projective plane to give a new counterexample to the aforementioned containment problem.