Mathematics, Statistics, and Computer Science **@ UIC**

Commutative Algebra Seminar

Chow rings of matroids are Koszul

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Abstract: Chow rings of matroids are a generalization of the cohomology rings of wonderful compactifications of complements of complex hyperplane arrangements introduced by de Concini and Procesi. They have been employed in the proof of the Heron-Rota-Welsh Conjecture by Adiprasito, Huh, and Katz on the log-concavity of the coefficients of the characteristic polynomial of a graph (or more generally a matroids); they were also employed in the recent proof of the Top Heavy Conjecture by Braden, Huh, Matherne, Proudfoot, and Wang. Among other properties, Chow rings of matroids are commutative, graded, Artinian, quadratic, Gorenstein K-algebras. Dotsenko conjectured that they are additionally Koszul. While previous work of Mastroeni, Schenck, and Stillman showed that not all quadratic, Artinian, Gorenstein K-algebras are Koszul, we show that all Chow rings of matroids are Koszul. In particular, this places restrictions on the possible Hilbert Series of Chow rings and implies that their Poincare series are rational. This is joint work with Matt Mastroeni and can be found in our preprint: https://arxiv.org/abs/2111.00393.

Wednesday, March 30 at 3:00 PM in Zoom