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

Algebraic Geometry Seminar

Defining equations of secant varieties to high degree Veronese reembeddings

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Abstract: We fix a projective variety $X \subset \mathbb{P}^n$ and an integer r. We are interested in the defining equations of the r-th secant variety to the d-uple Veronese reembedding of X, and we assume d is sufficiently large. One of the interesting cases is when $X = \mathbb{P}^n$. With these assumptions we prove that the $(r + 1)$-minors of the catalecticant matrix with linear entries are sufficient to define the secant variety set-theoretically if and only if the Hilbert scheme parametrising 0-dimensional Gorenstein subschemes of X of length r is irreducible. In particular, if X is smooth and either $\dim X$ is at most 3 or r is at most 13, then the minors are sufficient. If $\dim X$ is at least 4 and r is sufficiently large, then the locus defined by the minors has some additional components. These results motivate introducing cactus varieties, which generalise the secant varieties, and received a lot of attention since then.

The talk will be based on joint works with: 1) Adam Ginensky and Joseph Landsberg (JLMS 2013); 2) Weronika Buczynska (JAG 2014); 3) Joachim Jelisiejew (in preparation).

Wednesday, October 8 at 4:00 PM in SEO 427