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Local Okounkov Bodies and Limits in Positive Characteristic

This is based on joint work with Daniel Hernández.

The Hilbert-Samuel multiplicity of an m-primary ideal is a well-known example of an interesting numerical invariant in Commutative Algebra. For rings of positive characteristic, there are many invariants that are analogous to the Hilbert-Samuel multiplicity, but instead are defined via sequences of ideals related by the Frobenius map. In general, such sequences exhibit non-polynomial growth, and existence of limits is a difficult question.

In this talk, we will discuss a proof of the existence of many limits in this context. Our method realizes these positive characteristic multiplicities as volumes of regions in euclidean space. In addition to existence, this association provides new insights into these numerical limits.