Curvature and randomness

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The Euclidean Distance degree measures the algebraic complexity of writing the optimal solution to the best approximation problem to an algebraic variety as a function of the coordinates of the data point. The number of real-valued critical points of the distance function can be different for different data points. For randomly sampled data the expected number of real valued critical points is of high interest and it is called the average ED degree. In this talk we will see connections between the average ED degree, the ED discriminant and different curvatures of the underlying variety. The talk is based on [1, 2, 3].

References

[1] J. Draisma, E. Horobeţ, *The average number of critical rank-one approximations to a tensor*, Linear Multilinear Algebra, Volume **64** (2016), Issue 12, 2494-2514.

[2] E. Horobeţ, *The critical radii of curvature variety*, 2019, work in progress.

[3] E. Horobeţ, M. Weinstein, *Offset Hypersurfaces and Persistent Homology of Algebraic Varieties*, Computer Aided Geometric Design, 2019, available online.