The Average Number of Critical Rank-One Approximations to a Tensor

In this talk we present a study of the expected number of real critical points of the Euclidean distance function, on an algebraic variety X. This number, denoted by aEDdegree(X) and called the average ED degree, depends on the underlying probability distribution of the ambient space. In contrast with the number of complex-valued critical points, this number is typically not constant for all generic data points u, but rather constant on the connected components of the complement of an algebraic hypersurface. After discussing the general setting in the topic we concentrate on a particular algebraic variety X, the variety of rank-one tensors. The average ED degree of X is expressed in terms of the average absolute value of the determinant on a Gaussian-type matrix ensemble.