Large deviations in the distribution of the zeros of a random SU($m + 1$) polynomials

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Abstract

We consider the distribution of the zeros for the class of m-variable Gaussian random holomorphic functions: random SU($m + 1$) polynomials. These classes are the unique classes of Gaussian random holomorphic functions, up to multiplication by a non zero holomorphic function, whose expected zero set is uniformly distributed on complex projective space according to the Euclidean and Fubini-Study metric respectively. For a fixed random polynomial, we compute the order of the decay of the probability of the event where there are no zeros in a ball of radius r. Enroute to these results we also compute probability estimates for the event where a random function's unintegrated counting function deviates significantly from its mean.