

Meeting: 1003, Atlanta, Georgia, SS 34A, AMS Special Session on Algorithmic Algebraic and Analytic Geometry, I

1003-32-1501 **Bernard Shiffman*** (shiffman@math.jhu.edu), Department of Mathematics, Johns Hopkins University, Baltimore, MD 21218, and **Steve Zelditch**. *Counting zeros in complex domains: average numbers and standard deviations.*

It is well known that the average number of zeros in a domain U of a degree- N random polynomial (in the $SU(2)$ ensemble) equals N times the (normalized spherical) area of U . We show that for large degree N , the number of zeros will very likely be close to the average. In particular, we show that when U has piecewise smooth boundary, the standard deviation of the number of zeros in U is asymptotic to $\kappa N^{1/4}$. The same result holds for the zeros of random sections of powers of a positive line bundle on any compact complex curve (with the same constant κ , which is given by an explicit formula). If we pair the zero distribution by a smooth test function, then the standard deviation is instead asymptotic to $kN^{-1/2}$ (as observed by Sodin and Tsirelson for the case of polynomials). These results generalize to volumes of zero divisors on projective manifolds. (Received October 05, 2004)