"Essentially, all models are wrong, but some are useful."

— George E. P. Box

The Trivial Notions Seminar
Proudly Announces

The Semicircle Distribution

A talk by

Jiaoyang Huang

Abstract

The semicircle distribution

$$\frac{1}{2\pi}\sqrt{4 - x^2}, \quad x \in [-2, 2],$$

was first observed by Wigner while investigating the Hamiltonian operators in quantum mechanics. Since then, there are many more appearances of the semicircle distribution in the study of random matrices, complex networks and quantum information theory. Besides physics world, the semicircle distribution (called Sato-Tate distribution) was also observed as the distribution of certain "error terms" in number theory. In this talk, I will explain these examples where the semicircle distribution appears, and prove that the rescaled eigenvalue density of Gaussian Orthogonal Ensemble follows this distribution. Finally, I will try to convince you that in the non-commutative setting, the semicircle distribution plays the same role as that of the normal distribution in the commutative setting. That's why the semicircle distribution is ubiquitous.

Thursday, November 19th, at 1:00 pm
Science Center 222