Finite free probability and universality principles for roots of entire functions

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Host: Laszlo Erdös

We will discuss two conjectures for entire functions with real roots. The first, referred to as Cosine Universality, asserts that the roots become perfectly spaced in the limit of repeated differentiation, under very mild assumptions on the original function. The second conjecture, known as Hermite Universality, asserts that for an even entire function f certain polynomials associated to f, known as the Jensen polynomials, should converge to Hermite polynomials after an appropriate centering and re-scaling under the same assumptions as Cosine Universality. Specifically, we will see the surprising role random matrix theory plays in proving these conjectures for even functions. Using the recently developed theory of finite free probability we will translate these universality principles into probabilistic limit theorems which are roughly equivalent to averaging sums of random matrices. This talk will serve as an introduction to finite free probability. Based on joint work with Sean O'Rourke and David Renfrew.

Tuesday, October 1, 2024 04:30pm - 05:30pm

Office Bldg West / Ground floor / Heinzel Seminar Room (I21.EG.101)