## Seminar/Talk

# Pólya-Schur problems, free probability, and related random matrix models

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Host: Laszlo Erdös

Classical theorems of Laguerre, Plya, Hermite, and Schur (among others) characterized certain differential operators, which when applied to a univariate polynomial preserve the property of all the roots remaining in a specified domain, for example the real line. These results have been extended to general linear operators on multivariate polynomials, with the classification problem completely resolved for many important domains. We will discuss some of the motivations behind these Plya-Schur problems and their relationship to Voiculescu's free probability. Specifically, we will see that recent works in finite free probability on root distributions under the backwards heat flow and repeated differentiation can be generalized to any free infinitely divisible law. At the end of the talk we will discuss the natural random matrix ensembles associated with these root preserving operators. Our approach is motivated by these ensembles and the resolvent method in random matrix theory, as opposed to combinatorial approaches common in finite free probability. Based on joint work with Jonas Jalowy (https://arxiv.org/abs/2605.31356).

**Tuesday, June 16, 2026 04:15pm - 05:15pm**
Office Bldg West / Ground floor / Heinzel Seminar Room (I21.EG.101)

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