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August 30, 2021

Recurrence Coefficients and Orthogonal Polynomial Ensembles

Let μ be a probability measure on $\partial\mathbb{D}$ ($\mathbb{R}$ is similar)

Orthogonal Polynomial Ensemble

$\Pi_{1\leq k<j\leq n}\left|\lambda_k-\lambda_j\right|^2\Pi_{1\leq k\leq n}d\mu\left(\lambda_k\right)$ where $\lambda_k\in\partial\mathbb{D}$

Recurrence relation

$\{\Phi_n\}_n$ the monic orthogonal polynomials (i.e. $\langle\Phi_n,\Phi_m\rangle_{L_2(\mu)}=0$ if $n\neq m$)

$$z\Phi_n(z)=\Phi_{n+1}(z)+\overline{\alpha_n}z^n\overline{\Phi_n\left(1/\overline{z}\right)}$$

- Asymptotics of fluctuations via the analysis of the recurrence coefficients. CLT for various scales (macroscopic, mesoscopic).
- Stability of the limiting distribution of the fluctuations under perturbation of the underlying measure (viewed through the asymptotics of the recurrence coefficients).