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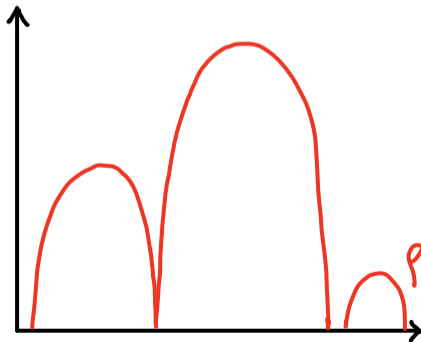
1 Eigenvalue densities of Hermitian matrices (with Erdős, Krüger, Nemish, Schröder)

- generalizations of Wigner matrices
- global and local laws
- **Dyson equation**

$$-M(z)^{-1} = zI - A + \mathcal{S}[M(z)]$$

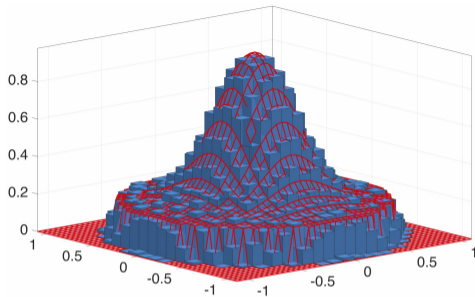
with $M(z) \in \mathbb{C}^{N \times N}$, $z \in \mathbb{C}_+$ and $A = A^*$.

- ρ with Stieltjes transform $z \mapsto \frac{1}{N} \text{Tr} M(z)$
- regularity and singularities of ρ
- universality of eigenvalue statistics

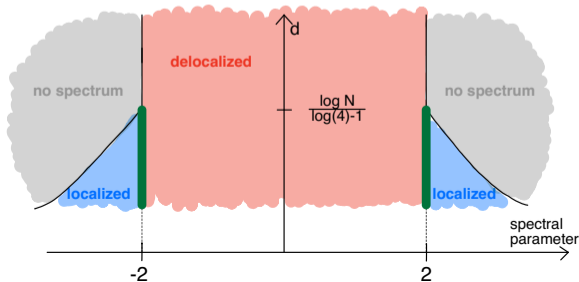


2 Eigenvalue densities of non-normal matrices (with Erdős, Krüger, Nemish)

- generalizations of matrices with iid. entries
- Girko's Hermitization
→ Dyson equation
- analogous questions as above



3 Erdős-Rényi graph $\mathbb{G}(N, d/N)$ (with Ducatez and Knowles)



Eigenvectors
delocalized \leftrightarrow localized

Eigenvalue statistics
Random matrix \leftrightarrow Poisson