

EDGE UNIVERSALITY FOR HEAVY-TAILED RANDOM MATRICES

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It is well known that the probability distribution of the largest eigenvalue of Gaussian ensembles as well as many other Wigner matrices converges to the Tracy-Widom distribution. In this talk, we discuss a simple criterion for this edge universality result for heavy-tailed matrices. We consider symmetric Wigner matrices H with $H_{ij} = N^{-1/2}x_{ij}$, where the off-diagonal entries x_{ij} are i.i.d. random variables with a distribution μ and the diagonal entries x_{ii} are i.i.d. random variables with another distribution $\tilde{\mu}$. Assuming that μ is centered with variance 1 and $\tilde{\mu}$ is centered with finite variance, we show that the probability distribution of the largest eigenvalue of H converges to the Tracy-Widom distribution if and only if $\lim_{s \rightarrow \infty} s^4 \mathbb{P}(|x_{ij}|^2 > s) = 0$ for $i \neq j$. A similar result holds for Hermitian Wigner matrices. This is a joint work with Jun Yin.