

中国科学院

随机复杂结构与数据科学重点实验室

学术报告

题目: Phase transition for the bottom singular vector of rectangular random matrices

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摘要: We consider the rectangular random matrix $X=(x_{ij})\in \mathbb{R}^{N\times n}$ whose entries are iid with tail probability $t^{-\alpha}$ for some $\alpha>0$. We consider the regime $N(n)/n\rightarrow a>1$ as n tends to infinity. Our main focus is the right singular vector corresponding to the smallest singular value, which will be called the "bottom singular vector". In this talk, we show the following phase transition regarding the localization length of the bottom singular vector: when $\alpha<2$ the localization length is $O(n/\log n)$; when $\alpha>2$ the localization length is of order n . The variational definition of the bottom singular vector suggests that the mechanism for this localization-delocalization transition when α goes across 2 is intrinsically different from the one for the top singular vector when α goes across 4. This is a joint work with Jaehun Lee and Xiaocong Xu.