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Title: Entrywise bounds for eigenvectors of random graphs and applications

Abstract: Let G be a graph randomly selected from $\mathbf{G}_{n,p}$, the space of Erdős-Rényi Random graphs with parameters n and p, where $p \geq \frac{\log^6 n}{n}$. Also, let A be the adjacency matrix of G, and v_1 be the first eigenvector of A. We provide two short proofs of the following statement: For all $i \in [n]$, for some constant $c > 0$

$$\left| v_1(i) - \frac{1}{\sqrt{n}} \right| \leq c \frac{1}{\sqrt{n}} \frac{\log n}{\log(np)} \sqrt{\frac{\log n}{np}}$$

with probability $1 - o(1)$. This gives nearly optimal bounds on the entrywise stability of the first eigenvector of (Erdős-Rényi) Random graphs. This question about entrywise bounds was motivated by a problem in unsupervised spectral clustering. We make some progress towards solving that problem.