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Random Matrices : A Survey

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Random matrices play important role in so many areas of mathematics : statistics, probability, mathematical physics, numerical analysis, combinatorics, TCS, to mention a few.

In the last five years or so, the field has witnessed several breakthroughs. I will give a survey on these results and the new techniques they introduced, and present several new questions/directions. The topics include :

- The singularity conjectures.
- Determinants and Permanents.
- von Neumann[-Goldstine problem and Spielman–Teng problems on the least singular value.
- The Circular Law conjecture.
- Eigenvalues of random graphs.
- Distribution of the eigenvectors.