
Preface

These notes include the material from a series of nine lectures given at the Saint-Flour probability summer school in 2006. The two other lecturers that year were Maury Bramson and Steffen Lauritzen.

The topic of these lectures was large random matrices, and more precisely the asymptotics of their macroscopic observables such as the empirical measure of their eigenvalues. The interest in such questions goes back to Wishart and Wigner, in the twenties and fifties respectively. Large random matrices have been since then intensively studied in theoretical physics, in connection with various fields such as QCD, quantum chaos, string theory or quantum gravity.

Since the nineties, several key mathematical results have been obtained and the theory of large random matrices expanded in various directions, in connection with combinatorics, operator algebra theory, number theory, algebraic geometry, integrable systems etc. I felt that the time was right to summarize some of them, namely those which connect with the asymptotics of macroscopic observables, with a particular emphasis on their relation with combinatorics and operator algebra theory.

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