Large N-limit in the random matrix model with external source. The Riemann-Hilbert approach

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Abstract

We develop the Riemann-Hilbert (RH) approach to the random Hermitian matrix model with an external source. We show that the correlation functions of the model can be expressed in terms of multiple orthogonal polynomials, and we relate the multiple orthogonal polynomials to a multidimensional RH problem. This gives a new powerful approach to the problem of large N-limit in the random matrix model with an external source. In the talk we will discuss how this approach works for the Gaussian ensemble of Brezin and Hikami.