A Riemann-Hilbert Method

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The Riemann-Hilbert approach of the theory of integrable systems will be presented. Applications of the method to the asymptotic problems arising in the theory of orthogonal polynomials and random matrices will be discussed in detail. The specific topics of the lectures include:


The lectures will be based on the material presented in the books,


and in the original papers


(Mostly, Deift’s book and papers [1], [2], [4], [6] will be used.)

Only a standard background in complex analysis and in the basic functional analysis is needed in order to follow the lectures. All the necessary specific facts concerning general Riemann-Hilbert theory, the theory of integrable systems, and the theory of orthogonal polynomials will be explained. The relevant general references are:


