Título: Random Matrices, Random Processes And Integrable Systems

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This book explores the remarkable connections between two domains that, a priori, seem unrelated: Random matrices (together with associated random processes) and integrable systems. The relations between random matrix models and the theory of classical integrable systems have long been studied. These appear mainly in the deformation theory, when parameters characterizing the measures or the domain of localization of the eigenvalues are varied. The resulting differential equations determining the partition function and correlation functions are, remarkably, of the same type as certain equations appearing in the theory of integrable systems. They may be analyzed effectively through methods based upon the Riemann-Hilbert problem of analytic function theory and by related approaches to the study of nonlinear asymptotics in the large N limit. Associated with studies of matrix models are certain stochastic processes, the "Dyson processes", and their continuum diffusion limits, which govern the spectrum in random matrix ensembles, and may also be studied by related methods.