

EXPONENTIAL ASYMPTOTICS FOR AIRY SOLUTIONS OF PAINLEVÉ II

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In this talk we present recent results on exponential asymptotics for Airy solutions of the Painlevé II equation, as the variable tends to infinity. The starting point is the leading term in the asymptotic expansion of the corresponding tau function, which can be obtained using a multiple integral formulation and the classical method of steepest descent. Using an exponential asymptotics ansatz for the tau function (which is a one parameter case of known general transseries for solutions of Painlevé II), we can put this family of solutions in the framework of exponential asymptotics, work out higher order terms and also use these for precise evaluation of the zeros of the tau function in the complex plane.

Joint work with Inês Aniceto (University of Southampton, United Kingdom) and Roberto Vega Álvarez (Instituto Superior Técnico, Lisbon, Portugal).