

國立中山大學應用數學系

學術演講

- 講者：Professor Yang Chen(陳珩仰教授)
University of Macau(澳門大學數學系)
- 講題：Singular Linear Statistics of the Laguerre Unitary Ensemble and Painlevé III: Double Scaling Analysis
- 時間：2015/6/22 (星期一) 15:10 ~ 16:00
- 地點：理學院四樓理 SC 4011 室
- 茶會：16:00 ~ 16:20 於理 SC 4010 室 (系辦公室)

摘要

We study the Hankel determinant,

$$D_n(t, \alpha) := \det \left(\int_0^\infty x^{j+k} w(x; t, \alpha) dx \right)_{j,k=0}^{n-1},$$

generated by singularly perturbed Laguerre weight,

$$w(x; t, \alpha) := x^\alpha e^{-x} e^{-t/x}, \quad 0 \leq x < \infty, \quad \alpha > 0, \quad t > 0,$$

obtained through a deformation of the Laguerre weight function,

$$w(x; 0, \alpha) := x^\alpha e^{-x}, \quad 0 \leq x < \infty, \quad \alpha > 0,$$

via the multiplicative factor $e^{-t/x}$. An earlier investigation was made on the finite n aspect of the problem and found that the logarithm of the Hankel determinant has an integral representation in terms of a particular P_{III} , and its derivative with t . In this talk we show that, under a double scaling, where n , the order of the Hankel matrix tends to ∞ , and t , tends to 0, the scaled – and therefore, in some sense, infinite dimensional – Hankel determinant, has an integral representation in terms of the C potential, and its derivatives. The second order non-linear differential equation which the C potential satisfies, after a minor change of variables, is another P_{III} , albeit with fewer number of parameters. Expansions of the double scaled determinant for small and large parameter are obtained.

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