Departamento de Matemática

Centro de Matemática e Aplicações

Seminar/Talk

Gaussian unitary ensembles with jump discontinuities, PDEs, and the coupled Painlevé IV system.

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Abstract: We study the Hankel determinant generated by the Gaussian weight with jump discontinuities at $t_1, \ldots, t_m$. By making use of a pair of ladder operators satisfied by the associated monic orthogonal polynomials and three supplementary conditions, we show that the logarithmic derivative of the Hankel determinant satisfies a second-order partial differential equation which is reduced to the σ-form of a Painlevé IV equation when $m = 1$. Moreover, under the assumption that $t_k - t_1$ is fixed for $k = 2, \ldots, m$, by considering the Riemann-Hilbert problem for the orthogonal polynomials, we construct direct relationships between the auxiliary quantities introduced in the ladder operators and solutions of a coupled Painlevé IV system.

- **Data:** 08 Abril 2025, 11h30min;
- **Local:** Sala de Reuniões, Departamento de Matemática, UBI.

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