Speaker (20 minutes talk)

An electrostatic interpretation of the zeros of sieved ultraspherical polynomials

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In an earlier work [K. Castillo, M.N. de Jesus and J. Petronilho, J. Math. Anal. Appl. 455, 1801–1821 (2017)], it was proved that the semiclassi- cal class of orthogonal polynomials is stable under polynomial transformations. In this work, we use this fact to derive in a unified way old and new properties concerning the sieved ultraspherical polynomials of the first and second kind. In particular, we derive ordinary differential equations for these polynomials. As an application, we use the differential equation for sieved ultraspherical polynomials of the first kind to deduce that the zeros of these polynomials mark the locations of a set of particles that are in electrostatic equilibrium with respect to a particular external field. The results presented are joint work with K. Castillo and J. Petronilho [J. Math. Phys. 61, 053501 (2020)].

Submission for an invited short talk in the parallel session "Random matrices, integrable systems and orthogonal polynomials" (organized by Maria das Neves Rebocho - UBI, Portugal; Rostyslav Kozhan - Uppsala University, Sweden.)