

Do polynomials dream of quadratic differentials?

Andrei Martinez-Finkelshtein^{*}

andrei@ual.es

Polynomials satisfying complex or non-hermitian orthogonality conditions are pervasive in approximation theory, random matrix theory, special functions, harmonic analysis, scientific computing and applications. Due to the freedom in the choice of the integration contour for such polynomials, the location of their zeros is a priori not clear. Nevertheless, numerical experiments show that they align themselves along certain curves on the plane. The accumulated knowledge, from the breakthrough developments in the 1980-ies to nowadays, says that the asymptotic description of these curves connects fascinating mathematical objects, such as extremal problems in electrostatics, Riemann surfaces, trajectories of quadratic differentials, algebraic functions; this list is not complete. This talk is a brief survey of some ideas related to this problem, including recent results and open problems.

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^{*}Departamento de Matemáticas, Universidad de Almería, Edificio CITE III, Desp. 256, 04120 Almería, SPAIN