

S-curves and (non-hermitian) orthogonal polynomials

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Abstract. Consider a sequence of polynomials (P_n) satisfying the (non-hermitian) complex orthogonality

$$\int_{\Gamma} z^j P_n(z) e^{-nV(z)} dz = 0, \quad j = 0, \dots, n-1,$$

where V is a fixed polynomial and the integration is on an unbounded simple contour Γ in \mathbb{C} ending up at ∞ in both directions and such that $\operatorname{Re} V(z) \rightarrow +\infty$, as $z \rightarrow \infty$ in Γ . The basic question we look at is the characterization of the limiting distribution of the zeroes of the polynomials P_n 's. Gonchar and Rakhmanov [1] characterized this limit, conditioned to the existence of a curve Γ with a certain symmetry property - the so called *S-property*. Based on recent works [2, 3], we will discuss the existence of this curve Γ and its characterization. This is a joint work with Arno Kuijlaars.

References

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- [3] Rakhmanov, E. A. Orthogonal polynomials and S-curves. *Contemp. Math.* **578**, Amer. Math. Soc., Providence, RI, 2012.