

Relative Asymptotics of Orthogonal Polynomials for Perturbed Measures

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Abstract

We survey and present some new results that are related to the behavior of orthogonal polynomials in the plane under small perturbations of the measure of orthogonality. More precisely, we introduce the notion of a polynomially small (PS) perturbation of a measure. Namely, if $\mu_0 \geq \mu_1$ and $\{p_n(\mu_j, z)\}_{n=0}^{\infty}, j = 0, 1$, are the associated orthonormal polynomial sequences, then μ_0 a PS perturbation of μ_1 if $\|p_n(\mu_1, \cdot)\|_{L_2(\mu_0 - \mu_1)} \rightarrow 0$, as $n \rightarrow \infty$. In such a case we establish relative asymptotic results for the two sequences of orthonormal polynomials. We also provide results dealing with the behaviour of the zeros of PS perturbations of area orthogonal (Bergman) polynomials.