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Orthogonal Polynomials with weight on the Complex Plane

Let G be a finite region, bounded by a Jordan curve $L := \partial G$ and $h(z)$ is a weight function in G . The polynomials $\{K_n(z)\}$, $\deg K_n = n$, $n = 0, 1, 2, \ldots$, satisfying the condition

$$\iint_G h(z) K_n(z) \overline{K_m(z)} d\sigma_z = \delta_{n,m}$$

are called orthonormal polynomials for the pair (G, h).

Let $\{z_i\}$, $i = \overline{1, m}$ is the fixed system of the points on L and the weight function $h(z)$ defined as the following:

$$h(z) = h_0(z) \prod_{i=1}^{m} |z - z_i|^{\gamma_i},$$

where $\gamma_i > -2$ and $h_0(z)$ is satisfying the condition $h_0(z) \geq c > 0$.

In this work we study the order of the height of polynomials $K_n(z)$ on boundary points of the region, where the boundary contour L and the weight function $h(z)$ has some singularities.