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Lacunary series in Q_K type spaces

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Abstract. Under mild conditions on the weight function K we characterize lacunary series in $Q_K(p,q)$ spaces, where $Q_K(p,q)$ spaces are Q_K type spaces of functions analytic in the unit disk.

1. Introduction

The Green function in the unit disk Δ with singularity at $a \in \Delta$ is given by $g(z,a) = -\log|\varphi_a(z)|$, where $\varphi_a(z) = (a-z)/(1-\bar{a}z)$ is a Möbius transformation of Δ. For $0 < r < 1$, let $\Delta(a,r) = \{z \in \Delta : |\varphi_a(z)| < r\}$ be the pseudo-hyperbolic disk with center $a \in \Delta$ and radius r.

Let $K : [0,\infty) \to [0,\infty)$ be a right-continuous and nondecreasing function. For $0 < p < \infty, -2 < q < \infty$, A function f analytic in Δ belongs to the space $Q_K(p,q)$ if

$$||f||_K^p = \sup_{a\in\Delta} \iint_\Delta |f'(z)|^p (1-|z|^2)^q K(g(z,a))dA(z) < \infty,$$

where $dA(z)$ is the Euclidean area element on Δ.