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Convergence of row sequences of simultaneous Fourier-Padé approximation[†]

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Abstract

We consider row sequences of simultaneous rational approximations constructed in terms of Fourier expansions and prove a Montessus de Ballore type theorem.

Keywords: Montessus de Ballore Theorem, simultaneous approximation, Fourier-Padé approximation.

MSC: Primary 41A21, 41A28; Secondary 41A25, 41A27.

§1. Introduction

Let $\mathbb{T} = \{z : |z| = 1\}$ denote the unit circle and $\mathbb{D} = \{z : |z| < 1\}$ the open unit disk. By σ we denote a finite positive Borel measure whose support is contained in $\mathbb{T}$ and $\sigma' > 0$ a.e. on $\mathbb{T}$. Let $\{\varphi_n\}$ be the corresponding sequence of orthonormal polynomials with positive leading coefficients

$$\frac{1}{2\pi}\int \varphi_j(z)\overline{\varphi_k(z)}d\sigma(z) = \delta_{j,k}, \qquad j,k \in \mathbb{Z}_+,$$

where as usual $\delta_{j,k} = 0, j \neq k$ and $\delta_{k,k} = 1$. By $\mathcal{H}(\overline{\mathbb{D}})$ we denote the space of functions which are analytic on some neighborhood of $\overline{\mathbb{D}}$.

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