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Lebesgue Constants in Local Dirichlet Spaces

This study delves into the analysis of partial Taylor sums S_n, $n \geq 0$, as finite rank operators on any Banach space of analytic functions on the open unit disc. In the classical disc algebra setting, these operators are known as Lebesgue constants, with their precise norm remaining unresolved. However, our focus shifts to the local Dirichlet spaces $\mathcal{D}_\zeta$, where we accurately determine the norm of S_n. This exploration involves three distinct norms on $\mathcal{D}_\zeta$, each providing unique values for the norm of S_n as an operator on $\mathcal{D}_\zeta$. Notably, these findings stand in sharp contrast to the classical disc algebra. Moreover, we extend our investigation to Cesaro means σ_n on local Dirichlet spaces, aiming to precisely determine their norm for the three introduced metrics.

Lebesgue constants in local Dirichlet spaces are vital for guiding the selection of optimal finite-dimensional approximations in numerical solutions of partial differential equations with Dirichlet boundary conditions in mathematical physics.