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On necessary and sufficient conditions for rationality of operator norm bounds in measure spaces

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Abstract

Norm bounds are useful properties of operators with interesting applications in operator algebras and quantum mechanics. Rationality of these norm bounds is very important in the study of operators in measure spaces. As a function of the perimeter $s, \mathcal{L}_\mu(s)$ is differentiable, nonincreasing, convex on $(0, \infty)$, and tends to $\mu(\{0\})$ as $s \to \infty$ and to $\mu((-1, 1))$ as $s \to +0$. In this presentation, we show that for all $n \in N$,

$$\underline{\mathcal{B}}(n; q, \mu) := b_n \mathcal{L}_\mu^{1/q}(nq) \leq \mathcal{B}(n; q, \mu) \leq \mathcal{B}_n \mathcal{L}_\mu^{1/q}((n-0.1)q) =: \overline{\mathcal{B}}(n; q, \mu),$$

where $b_n := \dfrac{(n+0.1)^{0.1}}{2^n n!}, \mathcal{B}_n := \dfrac{1}{2^n (n-0.1)^{0.1}(n-1)!}$. Moreover, we give various new conditions for rationality of operator norm bounds in measure spaces.

Keywords: Rationality; Norm bounds; Measure space.
Category: Functional analysis, Operator theory.

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