Li, Chong; Watson, G. A.
On approximation using a peak norm. (English) Zbl 0808.41018

Let \((X, \mu)\) be a finite measure space without atoms and having \(\mu(X) = 1\). Then the peak norm is defined for any \(\alpha, 0 < \alpha \leq 1\) and for any \(f \in L^p(X < \mu)\) by

\[
\|f\|^{(\alpha)}_p = \sup_{A \subset X, \mu(A) = \alpha} \left\{1/\alpha \int_A |f|^p \right\}^{1/p},
\]

where all integrals are with respect to the measure \(d\mu\).

In this paper best approximations of elements of \(L^p(X, \mu)\) from a linear subspace with respect to the peak norm are characterized. Uniqueness and strong uniqueness results are given for \(p > 1\), as well as conditions for the local Lipschitz continuity of the best approximation operator.

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MSC:

41A50 Best approximation, Chebyshev systems
41A65 Abstract approximation theory (approximation in normed linear spaces and other abstract spaces)

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strong uniqueness of best approximations

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