Verdoodt, Ann

Normal bases for the space of continuous functions defined on a subset of $\mathbb{Z}_p$. (English)

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Let K be a complete field extension of $\mathbb{Q}_p$. Let a, q be units of $\mathbb{Z}_p$ such that q is not a root of unity. Let V_q be the closure in $\mathbb{Q}_p$ of the set $\{aq^n \mid n \geq 0\}$. It is shown that the Banach space $C(V_q \to K)$ of continuous functions equipped with the uniform convergence (i.e. with the supremum norm) has an orthonormal basis (ε_k) consisting of characteristic functions of suitably chosen discs. Moreover, necessary and sufficient conditions are given in order for the linear combinations of ε_k to form an orthonormal basis for $C(V_q \to K)$.

Reviewer: W.Więsław (Wrocław)

MSC:

46S10 Functional analysis over fields other than $\mathbb{R}$ or $\mathbb{C}$ or the quaternions; non-Archimedean functional analysis
11S80 Other analytic theory (analogues of beta and gamma functions, p-adic integration, etc.)
46B15 Summability and bases; functional analytic aspects of frames in Banach and Hilbert spaces
46E15 Banach spaces of continuous, differentiable or analytic functions

Keywords:

Banach space of continuous functions equipped with the uniform convergence; supremum norm; orthonormal basis

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