RELATIVE BASES IN BANACH SPACES

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Abstract. We give in this work a new basis definition for Banach spaces and investigate some structural properties of certain vector-valued function space by using it. By novelty of new definition we prove that ℓ_∞ has a basis in this sense and so we deduce as a result that it has approximation property. In fact, we obtain a more general result that the linear subspace $P(\mathbb{B}, X)$ of $\ell_\infty(\mathbb{B}, X)$ of all those functions with precompact range has an X-Schauder basis. Hence $P(\mathbb{A}, X)$ has approximation property if and only if the Banach space X has. Note that $P(\mathbb{B}, X) = \ell_\infty(\mathbb{B}, X)$ for some finite-dimensional X. Further, we give a representation theorem to operators on certain vector-valued function spaces.

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