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Second derivatives of norms and contractive complementation in vector-valued spaces.

We consider 1-complemented subspaces (ranges of contractive projections) of vector-valued spaces $\ell_p(X)$, where X is a Banach space with a 1-unconditional basis and $p \in (1, 2) \cup (2, \infty)$. If the norm of X is twice continuously differentiable and satisfies certain conditions connecting the norm and the notion of disjointness with respect to the basis, then we prove that every 1-complemented subspace of $\ell_p(X)$ admits a basis of mutually disjoint elements. Moreover, we show that every contractive projection is then an averaging operator. We apply our results to the space $\ell_p(\ell_q)$ with $p, q \in (1, 2) \cup (2, \infty)$ and obtain a complete characterization of its 1-complemented subspaces. (Received January 16, 2007)