

Abstract of doctoral thesis

Descriptive and topological aspects in Banach space theory

Deskriptivní a topologické aspekty v teorii Banachových prostorů

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The thesis consists of three papers of the author. In the first paper, it is shown that the sets of Fréchet subdifferentiability of Lipschitz functions on a Banach space X are Borel if and only if X is reflexive. This answers a question of L. Zajíček. In the second paper, a problem of G. Debs, G. Godefroy and J. Saint Raymond is solved. On every separable non-reflexive Banach space, equivalent strictly convex norms with the set of norm-attaining functionals of arbitrarily high Borel class are constructed. In the last paper, binormality, a separation property of the norm and weak topologies of a Banach space, is studied. A result of P. Holický is generalized. It is shown that every Banach space which belongs to a \mathcal{P} -class is binormal. It is also shown that the asplundness of a Banach space is equivalent to a related separation property of its dual space.