

## Abstract

This thesis consists of four research papers. In the first paper we construct nonmetrizable compact convex sets with pathological sets of simpliciality, showing that the properties of the set of simpliciality known in the metrizable case do not hold without the assumption of metrizability. In the second paper we construct an example concerning remotal sets, answering thus a question of Martín and Rao, and present a new proof of the fact that in every infinite-dimensional Banach space there exists a closed convex bounded set which is not remotal. The third paper is a study of the relations between polynomials on Banach spaces and linear identities. We investigate under which conditions a linear identity is satisfied only by polynomials, and describe the space of polynomials satisfying such linear identity. In the last paper we study the coarse and uniform embeddability between Orlicz sequence spaces. We show that the embeddability between two Orlicz sequence spaces is in most cases determined only by the values of their upper Matuszewska-Orlicz indices.