

Summer School 2026

Topics in Banach Space Theory

Structural theorem for polyhedral normed spaces

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Abstract

A normed space is said to be polyhedral if the unit ball of each of its finite dimensional subspaces is a polytope. A celebrated result by Fonf, nowadays known as the “Structural Theorem”, states that the unit ball of every polyhedral Banach space can be covered by faces with non-empty topological interior. In this talk we provide an extension of this theorem to polyhedral normed spaces, as well as a weaker version considering faces with non-empty algebraic interior. Several examples show that without completeness Klee’s polyhedrality is no longer sufficient to recover Fonf’s result and stronger types of polyhedrality are needed, even for the algebraic version. As an application, we characterize when a normed space has a locally finite tiling by bounded bodies. The talk concludes with some renorming results which show how diverse the situation can be in the incomplete case. This talk is based on a joint work with Carlo Alberto de Bernardi, Tommaso Russo and Jacopo Somaglia.