

Summer School 2026

Topics in Banach Space Theory

When Positivity Implies Compactness

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Day and time Thursday: 15:30–15:55

Abstract

The aim of this talk is to show how positivity can force compactness for multilinear operators between Banach lattices. More precisely, given $1 \leq p_1, \dots, p_n < \infty$ and $1 \leq q < \infty$ such that $\sum_{i=1}^n \frac{1}{p_i} < \frac{1}{q}$, we prove that every positive n -linear operator from $\ell_{p_1} \times \dots \times \ell_{p_n}$ into $L_q(\nu)$, as well as every positive n -linear operator from $L_{p_1}(\mu) \times \dots \times L_{p_n}$ into ℓ_q , is compact, for arbitrary positive measures μ_1, \dots, μ_n, ν . These results extend known linear and multilinear compactness theorems and arise from a broader study of M -weakly compact multilinear operators on Banach lattices. These compactness results also lead to applications in the theory of norm-attaining operators, which will be discussed in the final part of the talk. The main results presented in this talk are based on joint work with Geraldo Botelho (UFU).