

Summer School 2026

Topics in Banach Space Theory

Combinatorics in nonseparable Banach spaces

Name	Christina Brech
University	University of São Paulo
Day and time	Monday: 9:30–10:10 Tuesday: 11:15–11:55 Thursday: 9:10–9:50

Abstract

This tutorial introduces some of the main set-theoretic techniques used in the study of biorthogonal systems in nonseparable Banach spaces. We discuss how combinatorial principles influence the existence of uncountable biorthogonal systems, and how compact spaces with prescribed properties can be constructed to produce Banach spaces exhibiting pathological behavior. In particular, we outline consistent constructions of $C(K)$ spaces without uncountable biorthogonal systems. We conclude with a recent result showing how the P-Ideal Dichotomy enforces the existence of large biorthogonal systems. Particular emphasis will be placed on the cardinal invariant known as the bounding number, whose definition will be introduced along the way.