Topological Methods in Nonlinear Analysis
Volume 66, No. 2, 2025, 783–792
DOI: 10.12775/TMNA.2025.033

© 2025 Juliusz Schauder Centre for Nonlinear Studies
Nicolaus Copernicus University in Toruń

AN ESTIMATION OF THE BANACH–MAZUR DISTANCE BETWEEN THE SPACE OF CONVERGENT SEQUENCES AND A CONCRETE MODEL OF A SPACE OF AFFINE CONTINUOUS FUNCTIONS

Jeimer Villada Bedoya

Abstract. In this paper c denotes the space of convergent sequences endowed with the supremum norm and $\mathcal{W}$ is the hyperplane of c defined by $\mathcal{W} = \Big\{(x(i)) \in c : \lim\limits_{i\to\infty}(x(1)+x(2))/2\Big\}$. We pose the problem of determining the Banach–Mazur distance $d(c,\mathcal{W})$ and present a method to estimate such distance from below together with tight bounds for $d(\mathcal{W},c)$.

1. Introduction

Let X be an infinite dimensional real Banach space, we denote by B_X its closed unit ball and by $\operatorname{ext} B_X$ the set of all extreme points of B_X.

A Banach space X is called an L_1-predual (or a Lindenstrauss space) if X^* is isometric to $L_1(\mu)$ for some measure μ. The most studied class of L_1-preduals are $C_0(K)$ spaces. For a locally compact Hausdorff space K, $C_0(K)$ denotes the Banach space of all continuous real-valued functions on K which vanish at infinity, endowed with the supremum norm; it is said that a continuous function $f\colon K \to \mathbb{R}$ vanishes at infinity if the set $\{x \in K : |f(x)| \geq \varepsilon\}$ is compact for every $\varepsilon > 0$. If K is compact, then $C_0(K)$ consists of all continuous real-valued functions on K and this space will be denoted by $C(K)$.

2020 *Mathematics Subject Classification.* 46B03, 46B25, 46E15.
Key words and phrases. Banach–Mazur distance; space of convergent sequences; hyperplane; space of affine continuous functions.