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Title: On the Banach-Mazur rotation problem

Abstract: The Banach-Mazur rotations problem, appearing in Banach's famous book in 1932, asks whether a separable Banach space with a transitive norm has to be isometric or isomorphic to a Hilbert space. Recall that the norm on a Banach space X is called transitive if for every two points x, y in the unit sphere of X there exists a surjective isometry T of X onto itself such that $Tx = y$.

In this talk I will survey some recent developments related to this problem, stressing two directions of research which were developed in the last ten years. The first one is the study of approximate versions of the Banach-Mazur rotations problem in renormings of classical Banach spaces, including the important cases of the Lebesgue spaces ℓ_p and L_p , and results concerning existence and properties of maximal isometry groups in various Banach spaces. The second direction concerns recent developments of multidimensional formulations of the Banach-Mazur rotations problem and associated results.

Some new results will also be included.

References

- (1) F. Cabello Sánchez, V. Ferenczi, B. Randrianantoanina, On Mazur rotations problem and its multidimensional versions, To appear in the special issue of *the São Paulo J. of Math. Sci.* dedicated to the Golden Jubilee of the Institute of Mathematics and Statistics of the University of São Paulo, 2021, arXiv:2012.08344
- (2) S. J. Dilworth, B. Randrianantoanina, On an isomorphic Banach-Mazur rotation problem and maximal norms in Banach spaces, *J. Funct. Anal.* **268**: 1587–1611 (2015).