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The ergodicity of weak Hilbert spaces

The positive solution to the homogeneous Banach space problem, states that if a Banach space X has only one class of isomorphism of infinite-dimensional subspaces then X must be isomorphic to ℓ_2. It is therefore natural to investigate the complexity of the relation of isomorphism between infinite-dimensional subspaces of a given separable Banach space which is not isomorphic to ℓ_2. As defined by Ferenczi and Rosendal, a separable Banach space X is said to be *ergodic* if the relation E_0 is Borel reducible to isomorphism between subspaces of X. They conjectured that every separable Banach space not isomorphic to ℓ_2 must be ergodic.

We provide some additional support to this conjecture by proving that inside the regular class of weak Hilbert spaces, every Banach space which is not isomorphic to ℓ_2 is ergodic. We actually show that the same is true for the class of asymptotically Hilbertian spaces.

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