Contractive Projections and Lifting of Operators on Banach Spaces

F. Botelho
Department of Mathematical Sciences

The University of Memphis

April 24, 2021

A Banach space Y has the *lifting property* (LP) if, for every operator ψ from a Banach space X to a Banach space W and for every $S \in L(Y, W)$, there is $\hat{S} \in L(Y, X)$ such that $S = \psi \circ \hat{S}$. It was noted that ℓ_1 has the LP and every space isomorphic to ℓ_1 also has the LP. A focus on W rather than Y leads to the *alternate lifting property* (ALP). An infinite dimensional Banach space with ALP is isomorphic to $\ell^1(\Gamma)$, for some suitable index set Γ. Following this trend of ideas, we consider other properties involving lifting of operators, we describe necessary and sufficient conditions for their existence and give explanatory examples.