SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

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Weak spectral decompositions and invariant subspaces

One of the most successful strategies to produce invariant subspaces for a continuous linear operator $T : X \to X$ (acting on a complex Banach space X) is to split its spectrum $\sigma(T)$ into suitable pieces. A cornerstone at this regard is given by the class of normal operators acting on Hilbert spaces. In fact, along the years, several attempts have been pursued to transfer some of the most profitable spectral properties of normal operators to the Banach space setting. In this line, the class of decomposable operators, introduced by Foiaș in the sixties, plays an essential role in local spectral theory.

A common technique to obtain spectral decompositions for an operator T relies on the construction of a functional calculus which relates subsets of $\sigma(T)$ with the zero set of complex-valued functions. Following those ideas, in our article [1], we introduce a weaker functional calculus to provide invariant subspaces for large classes of Banach space operators via local spectral manifolds. Our approach uses abstract harmonic analysis along with local spectral theory to construct non-trivial spectral decompositions. In particular, we generalize previous results on the existence of invariant subspaces due to Atzmon, Beauzamy, and Colojoară and Foiaș, to general classes of Banach algebras allowing partitions of unity.

REFERENCIAS:

[1] E. A. Gallardo-Gutiérrez, M. Monsalve-López. Spectral decompositions arising from Atzmon's hyperinvariant subspace theorem. Integral Equations Operator Theory 93 (1) (2021).

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