Título: On The Algebraic Foundations Of Bounded Cohomology

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Sinopsis

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It is a widespread opinion among experts that (continuous) bounded cohomology cannot be interpreted as a derived functor and that triangulated methods break down. The author proves that this is wrong.

He uses the formalism of exact categories and their derived categories in order to construct a classical derived functor on the category of Banach G-modules with values in Waelbroeck's abelian category. This gives us an axiomatic characterization of this theory for free, and it is a simple matter to reconstruct the classical semi-normed cohomology spaces out of Waelbroeck's category.

The author proves that the derived categories of right bounded and of left bounded complexes of Banach G-modules are equivalent to the derived category of two abelian categories (one for each boundedness condition), a consequence of the theory of abstract truncation and hearts of t-structures. Moreover, he proves that the derived categories of Banach G-modules can be constructed as the homotopy categories of model structures on the categories of chain complexes of Banach G-modules, thus proving that the theory fits into yet another standard framework of homological and homotopical algebra.