

# Han's conjecture for finite-dimensional algebras and its analogue for pseudocompact algebras

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## Abstract

Given a finite dimensional algebra  $A$  over an algebraically closed field  $k$ , Han's conjecture relates two homological invariants associated to  $A$ : its global dimension (which measures the complexity of category of  $A$ -modules) and its Hochschild homology. Namely, it states (see [3]) that global dimension of  $A$  is finite if and only if Hochschild homology of  $A$  vanishes for large enough degrees.

Recently, using the relative version of Hochschild homology with respect to a subalgebra  $B$ , some progress was made in showing the Han's conjecture (see [1, 2] and references therein). It is based on existence of Jacobi-Zariski long nearly exact sequences which relates the usual and relative versions of Hochschild homology. Such approach allows the authors to show that the class of algebras verifying Han's conjecture is closed by so-called bounded extensions of algebras.

Pseudocompact algebras naturally generalize the finite-dimensional algebras. So one can consider certain analogue of Han's conjecture for such class of algebras and existence of Jacobi-Zariski sequences in this context. In my talk I aim to discuss the above topics with recent advances made.

Based on joint works in progress with John MacQuarrie (UFMG).

## References

- [1] Claude Cibils, Marcelo Lanzilotta, Eduardo N. Marcos, and Andrea Solotar. Cibils et al., Split bounded extension algebras and Han's conjecture, *Pacific J. Math.* **307** (2020), no. 1, 63–77.
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- [3] Y. Han, Hochschild (co)homology dimension, *J. London Math. Soc.* (2) **73** (2006), no. 3, 657–668.

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