

Finitistic Dimension Conjecture, Representation Dimension and relations to other dimensions in non-commutative algebra

Gordana Todorov, Tapas Seminar, Northeastern University, May 20, 2008

Abstract: *Finitistic Dimension Conjecture* states that the projective dimensions of modules which have finite projective dimensions are bounded, i.e. $\sup\{pdM \mid pdM < \infty\}$ is finite. It is known that the conjecture is true for the categories of finitely generated modules over many classes of artin algebras.

Representation Dimension of an artin algebra is the smallest global dimension of the endomorphism algebras of finitely generated generator-cogenerator modules, i.e. $rep.dim\Lambda := \inf\{gl.dim\Gamma \mid \Gamma = End_{\Lambda}(\Lambda \oplus D\Lambda \oplus X)^{op}\}$.

In this talk we will present a proof that the finitistic dimension conjecture holds true for the categories of finitely generated modules over artin algebras which have representation dimension at most 3. (Result from 1992). For about ten years there were no known examples of artin algebras of higher representation dimension. It is known now that there are artin algebras of arbitrary representation dimension, however representation dimension is always finite.

Other notions of dimensions related to the representation dimension will be introduced, e.g. dimensions of subcategories of triangulated categories like derived categories and others; known results and open questions will be stated.