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On the global dimension of the endomorphism algebra of a τ-tilting module

We consider finite dimensional algebras over an algebraically closed field.

Recently, Adachi, Iyama and Reiten introduced a generalization of the classical tilting theory, called τ- tilting theory. It is known that mutation of tilting modules is not always possible to do. It depends on the choice of the indecomposable direct summands. Support τ- tilting modules can be regarded as a completion of the class of tilting modules from the point of view of mutation. The above mentioned authors showed that mutation of support τ- tilting modules is always possible. In addition, τ-tilting modules satisfy nice properties of tilting modules.

Given an algebra A of finite global dimension and B the endomorphism algebra of a tilting A-module, it is well-known that there exists a deep connection between the global dimension of A and the global dimension of B. Moreover, the global dimension of B is always finite.

Now, let A be an algebra of finite global dimension and B the endomorphism algebra of a τ-tilting A-module. A natural question is if there exists a relation between the global dimension of A and the global dimension of B. In order to give an answer to such a question we find some results that relate the global dimension of A with the global dimension of B. We show that the global dimension of B is not always finite. Moreover, in case we deal with a monomial algebra of global dimension 2, we prove that the global dimension of B is finite.