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ITERATED TILTED ALGEBRAS INDUCED FROM COVERINGS OF TRIVIAL EXTENSIONS OF HEREDITARY ALGEBRAS

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Introduction.

Recently the relations between tilting theory and trivial extension algebras are deeply studied. Let A and B be basic connected artin algebras over a commutative artin ring C. In [6] Tachikawa and Wakamatsu showed that the existence of stably equivalence between categories over the trivial extension algebras $T(A)=A\ltimes DA$ and $T(B)=B\ltimes DB$ under the assumption that there is a tilting module T_A with $B=\mathrm{End}(T_A)$. In case C is a field, Hughes and Waschbüsch proved that if $T(B)$ is representation-finite of Cartan class Δ, then there exists a tilted algebra A of Dynkin type Δ such that $T(B)\cong T(A)$ [4]. Assem, Happel and Roldan showed that, for an algebra B over an algebraically closed field, $T(B)$ is representation-finite iff B is an iterated tilted algebra of Dynkin type [1]. However in case $T(B)$ is not of finite representation type the condition $T(B)\cong T(A)$ with A hereditary does not forces B to be an iterated tilted algebra.

Let's consider the covering $\hat{A}$ of $T(A)$ [4]. The author proved that the condition $\hat{A}\cong\hat{B}$ implies $T(A)\cong T(B)$ and that the converse holds if $T(A)$ is representation-finite [5]. In this paper, we prove that the condition $\hat{B}\cong\hat{A}$ with A hereditary implies that B is an iterated algebra obtained from A. It is to be noted that in case A is not necessary representation-finite. Moreover, the proof of our theorem shows that such an algebra B is obtained by at most 3m times processes tilting from A, where m is the number of non-isomorphic primitive idempotents of A.

1. Preliminaries.

In this section, we recall some definitions and important results. Let A be an artin algebra. An A-module T_A is said to be a tilting module provided the following three conditions are satisfied,

(1) proj. dim $T_A\leq 1$

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