TSUKUBA J. MATH.
Vol. 13 No. 1 (1989), 31—72

DOMESTIC TRIVIAL EXTENSIONS OF SIMPLY CONNECTED ALGEBRAS

By

Ibrahim ASSEM, Jerzy NEHRING and Andrzej SKOWROŃSKI

Dedicated to Professor H. Tachikawa on his 60th birthday

Abstract Let A be a finite-dimensional, basic and connected algebra (associative, with 1) over an algebraically closed field. It is called simply connected it it is triangular and, for any presentation of A as a bound quiver algebra, the fundamental group of its bound quiver is trivial. Let $T(A)$ denote the trivial extension of A by its minimal injective cogenerator. We show that, if A is simply connected, then the following conditions are equivalent: (i) $T(A)$ is representation-infinite and domestic, (ii) $T(A)$ is 2-parametric, (iii) there exists a representation-infinite tilted algebra B of Euclidean type $\tilde{\boldsymbol{D}}_n$ or $\tilde{\boldsymbol{E}}_p$ such that $T(A)\simeq T(B)$, (iv) A is an iterated tilted algebra of type $\tilde{\boldsymbol{D}}_n$ or $\tilde{\boldsymbol{E}}_p$.

Introduction.

Let k denote a fixed algebraically closed field, and A a finite-dimensional k-algebra (associative, with an identity) which we shall moreover assume to be basic and connected. We shall denote by mod A the category of finite-dimensional right A-modules. The *trivial extension* $T(A)$ of A by its minimal injective cogenerator bimodule $DA=\mathrm{Hom}_k(A, k)$ is the algebra whose additive structure is that of the group $A\oplus DA$, and whose multiplication is defined by:

$$(a, f)(b, g)=(ab, ag+fb)$$

for $a, b\in A$ and $f, g\in {}_A(DA)_A$. Then $T(A)$ is a self-injective and, in fact, a symmetric algebra.

Trivial extension algebras have been extensively investigated in representation theory. First, in the representation-finite case, they were studied by Müller [32], Green and Reiten [22] and Iwanaga and Wakamatsu [30] when the radical

Received November 11, 1987.