ON ISOMORPHISMS OF GENERALIZED MULTIFOLD EXTENSIONS OF ALGEBRAS WITHOUT NONZERO ORIENTED CYCLES

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Throughout this note $\Bbbk$ is an algebraically closed field, and all algebras considered here are assumed to be basic finite-dimensional associative $\Bbbk$-algebras, which are regarded as $\Bbbk$-categories by fixing a basic set of primitive idempotents of A. Let A be an algebra. If $\psi \in \mathrm{Aut}(A)$, then ψ canonically induces an automorphism $\hat{\psi}$ of $\hat{A}$. A category of the form $T^n_\psi(A) := \hat{A}/\langle\hat{\psi}\nu^n_A\rangle$ with $n \in \mathbb{Z}$ is called a *twisted n-fold extension* of A, where ν_A is the Nakayama automorphism of $\hat{A}$. An automorphism ϕ of the repetitive category $\hat{A}$ is said to *have a jump* $n \in \mathbb{Z}$ if $\phi(A^{[0]}) = A^{[n]}$. Note that in this case ϕ induces an automorphism $\phi_0 := (\mathbb{1}^{[0]})^{-1}\nu_A^{-n}\phi\mathbb{1}^{[0]}$ of A. A category of the form $\hat{A}/\langle\phi\rangle$ with ϕ an automorphism of $\hat{A}$ having a jump n is called a *generalized n-fold extension* of A (or a *generalized multifold extension* of A if n is not specified). Twisted n-fold extensions of A are generalized n-fold extensions of A.

An algebra A is called *piecewise hereditary* of *tree type* T if it is derived equivalent to a hereditary algebra H and the underlying graph of the quiver of H is a tree T. In [1] we gave a derived equivalence classification of generalized multifold extensions of piecewise hereditary algebras of tree type. Then we have proved that a generalized n-fold extension $\hat{A}/\langle\phi\rangle$ of A is derived equivalent to a twisted n-fold extension $T^n_{\phi_0}(A)$ of A. And we posed the following question.

Question. *When are the algebras $\hat{A}/\langle\phi\rangle$ and $T^n_{\phi_0}(A)$ isomorphic?*

In this talk we give an answer as a corollary of the following theorem.

Theorem. *Let A be an algebra without nonzero oriented cycles and $\phi, \psi \in \mathrm{Aut}(\hat{A})$ with a jump $n \in \mathbb{Z}$. If $\phi_0 = \psi_0$, then $\hat{A}/\langle\phi\rangle$ and $\hat{A}/\langle\psi\rangle$ are isomorphic.*

References

[1] Asashiba, H.; Kimura, M.: *Derived equivalence classification of generalized multifold extensions of piecewise hereditary algebras of tree type*, to appear in Algebra and Discrete Mathematics Journal

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