On the gendo-symmetric algebra of a trivial extension algebra

Takahiro Honma, Takuma Aihara and Aaron Chan

Tokyo University of Science, Tokyo Gakugei University, Nagoya University

Email: 1119704@ed.tus.ac.jp, aihara@u-gakugei.ac.jp, aaron.kychan@gmail.com

In representation theory of algebras, endomorphism algebras play important roles. For example, the endomorphism algebra of a progenerator is Morita equivalent to the original algebra. More generally, the endomorphism algebra of a tilting module is derived equivalence to the original algebra. When a given algebra is representation-finite, the endomorphism algebra of the additive generator in the module category is the Auslander algebra [A]. Thus, endomorphism algebras are interesting subjects of study.

Our purpose is to investigate the representation types of endomorphism algebras. However, in most cases, endomorphism algebras are representation-infinite. On the other hand, the endomorphism algebra of a generator is expected to be easy deal with. Therefore, we consider the endomorphism algebra of a generator over a symmetric algebra, so-called a *gendo-symmetric algebra* [FK]. In particular, our aim is to determine when a gendo-symmetric algebra is representation-finite. In the case, we also study the structure of the Auslander-Reiten quiver.

Our main result can be stated as follows. Let B be the trivial extension algebra of an algebra A and X an indecomposable non-projective B-module. Consider the gendo-symmetric algebra $\Lambda := \mathrm{End}_B(B \oplus X)$ given by the generator $B \oplus X$. In this talk, we give a complete description of Λ being representation-finite. Moreover, we construct the stable Auslander-Reiten quiver of Λ.

References

[A] M. AUSLANDER, Representation theory of Artin algebras. II. *Comm. Algebra* **1** (1974), 177–268.

[FK] M. FANG AND S. KOENIG, Gendo-symmetric algebras, canonical comultiplication, bar cocomplex and dominant dimension. *Trans. Amer. Math. Soc.* **368**(2016), no. 7, 5037–5055.