REPRESENTATIONS OF LEAVITT PATH ALGEBRAS OVER AN ADDITIVE CATEGORY WITH KRULL-SCHMIDT

Ayten Koç[1]

Department of Mathematics and Computer Science
Istanbul Kültür University
E-mail: akoc@iku.edu.tr

In an additive category with Krull-Schmidt every object has a unique (up to ordering) representation as a (finite) direct sum of indecomposables. This is less restrictive than a Krull-Schmidt category where the endomorphism rings of indecomposables need to be local [K]. The category of finitely generated modules over a PID is an example.

The category of unital modules of an Leavitt path algebra (over a field) is equivalent to the category of functors from a digraph (regarded as a small category where vertices are the objects and paths are the morphisms) to vector spaces satisfying an isomorphism condition by [KO, Theorem 2]. This enables us to talk about representations of an LPA (Leavitt path algebra) over an additive category without actually defining the LPA. In fact the algebra is only defined up to Morita equivalence when it exists! If Krull-Schmidt holds in the additive category then there is a classification of all representations similar to the classification of all finite dimensional representations over a field [KO, Theorem 32]. In particular there is a nonzero unital module if and only if the digraph has a maximal cycle or a maximal sink.

References

[1] A. Koç, M. Özaydın, *Representations of Leavitt path algebras*, arXiv:1510.03382v1 [math.RA] (2015).

[2] H. Krause, *Krull-Schmidt Categories and Projective Covers*, Expositiones Mathematicae **33** (2015), 535–549.

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[1]Joint work with Murad Özaydın, University of Oklahoma, Department of Mathematics, USA