

Auslander-Reiten triangles in the stable category of finitely generated modules over a repetitive algebra

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Third International Colloquium: Alexander Zavadskij

Young researcher presentation

Medellín, Colombia, June 28-29, 2018

Abstract

This is a joint-work with Hernán Giraldo and José A. Vélez-Marulanda. Let k be an algebraically closed field, and let Λ be a finite dimensional k -algebra. Denote by $\hat{\Lambda}$ the repetitive algebra of Λ (in the sense of D. Hughes and J. Waschbüsch). It is well-known that $\hat{\Lambda}\text{-mod}$ (the stable category of finitely generated left $\hat{\Lambda}$ -modules) is triangulated and that it has Auslander-Reiten triangles, i.e., triangles of the form

$$M \xrightarrow{u} N \xrightarrow{v} L \xrightarrow{w} TM \quad (1)$$

such that M and N are indecomposable, the morphism w is non-trivial, and if $f : X \rightarrow L$ is not a retraction, then there exists $f' : X \rightarrow N$ such that $vf' = f$. In particular, under this situation we have that u and v are irreducible morphisms. In this talk, we use results previously obtained by H. Giraldo, to describe the morphisms u and v . More precisely, we prove the following result. Assume that (1) is an Auslander-Reiten triangle in $\hat{\Lambda}\text{-mod}$. Then we have the following.

- (i) If u is *smonic*, then v is *sepic*.
- (ii) If u is *sepic*, then v is *sirreducible*.
- (iii) If u is *sirreducible*, then v is either *smonic* or *sirreducible*.

We also provide examples of two finite dimensional k -algebras that verify the aforementioned result. This talk is also inspired by current work of Edson Ribeiro Alvares, Sônia Fernandes and Hernán Giraldo on the shape of Auslander-Reiten triangles in the bounded derived category of a finite dimensional k -algebra.