

Auslander Reiten Theory in complex categories

María José Souto Salorio

Universidade de A Coruña, Spain

The classical Auslander-Reiten theory started in the seventies of the last century. It involves two relevant notions: the almost split sequences (a.s.s. for short) and the irreducible morphisms in $\text{mod } \Lambda$ (the category of finitely generated modules over an Artin algebra). The existence of minimal left or right almost split maps is one of the main assertions of this theory. And, from it one can produce a wealth of irreducible morphism. Moreover, the translate functor which relates the two ends of an almost split sequence, yields a tool for obtaining new indecomposable modules from a given one.

In the mid eighties, Auslander-Reiten theory for triangulated categories has been initiated by D. Happel. He introduced Auslander-Reiten triangles and characterized their existence in the derived category $\mathbf{D}^b(\text{mod } \Lambda)$.

On the other hand, while it is known what the terms of certain irreducible maps look like, we do not know in general so much about irreducible maps in $\mathbf{D}^b(\text{mod } \Lambda)$.

In this talk, we present some results obtained in joint work with Raymundo Bautista. We prove the existence of a.s.s. in certain subcategories of complexes and show its relation with the existence of Auslander-Reiten triangles in $\mathbf{D}^b(\text{mod } \Lambda)$. In turn, we present some properties of irreducible morphisms in complexes similar to the ones of irreducible morphisms in $\text{mod } \Lambda$.