THE FIELDS INSTITUTE
FOR RESEARCH IN MATHEMATICAL SCIENCES

ABSTRACTS 1.2

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Selfinjective Koszul algebras (50-60)

This is joint work with Roberto Martínez-Villa on the structure of the A-R quiver of a selfinjective Koszul algebra. A few years ago, Ringel showed that if Λ is a selfinjective Koszul algebra whose Loewy length is greater than three, and if M is a nonprojective Koszul module, then the stable component of the Auslander-Reiten quiver containing M is of the form $\mathbf{Z}A_\infty$. Moreover, the module M lies on the mouth of this component.

There is a generalization of the notion of Koszul modules; it was first formalized by Green and and Martinez in the nineties. We call theses modules weakly Koszul modules and they can be characterized by having very special filtrations whose factors are Koszul modules. Another equivalent definition is that their associated graded module is a Koszul module. It turns out that if Λ is a selfinjective Koszul algebra of Loewy length greater than three, then the stable part of each Auslander-Reiten component containing a weakly Koszul module is of the form $\mathbf{Z}A_\infty$, therefore generalizing Ringel's result. If, in addition, the Koszul dual of Λ is noetherian, then every stable component of the Auslander- Reiten quiver is of the type $\mathbf{Z}A_\infty$.

I will also present other properties of weakly Koszul modules in the finite dimensional Koszul not necessarily selfinjective case