Tilted algebras via quivers with relations

SONIA TREPODE

Department of Mathematics
Universidad Nacional de Mar del Plata,
Mar del Plata, Argentina
e-mail: strepode@mdp.edu.ar

Talk, CIMPA SCHOOL
Medellín, Colombia, June 18-27, 2018

Abstract

Joint work with Natalia Bordino, UNMDP and Elsa Fernández, UNSJB.

Tilted algebras have proved to be a very important tool in the representation theory of finite dimensional algebras. There exists a well known characterization of tilted algebras in terms of its module category. Since, for applying this criterion, we need to have a very good knowledge of the module category, several authors have been interested in finding sufficient conditions for an algebra to be tilted in terms of its quiver with relation, see [1], [3], [4], [5], [8], [6], [7], [9], [10], [11].

In this talk, we consider a bigger class of algebras, that is, the quasitilted algebras introduced by Happel, Reiten and Smalø in [12]. We introduced a notion of bounded consecutive relations inspired by the one given by Assem and Redondo in [2]. Our first result states that an algebra with global dimension two having non consecutive bounded relations is a quasitilted algebra. Therefore, we show that the converse of this result does not hold. On the other hand, if a quasitilted algebra has bounded consecutive relations, we give a necessary condition over this kind of relations.

Finally, we prove our main result, if A is a tame algebra with global dimension two having non consecutive bounded relations, then A is a tilted algebra.

Bibliography

[1] I. Assem. Tilted algebras of type A_n. Comm. Algebra 19, (1982), 2121 1231.

[2] I. Assem, M. J. Redondo. The first Hochschild cohomology group of a schurian cluster-tilted algebra. Manuscripta Math. 128, (2009), no. 3, 373-388.

[3] N. Bordino, E. Fernández and S. Trepode. On the quiver with relations of a quasitilted algebra and applications. Communications in Algebra. Vol 45 Issue 9 (2017) 4050-4061.

[4] N. Bordino, and S. Trepode. Tilted algebras via quivers with relations. In preparation.

[5] Huard, F. Tilted gentle algebras. *Comm. Algebra* (1998) 26, 63-72.

[6] Huard, F. and Liu, S. Tilted special biserial algebras. *J.Algebra* (1999) 217, 679-700.

[7] Huard, F. and Liu, S. Tilted string algebras. *J. Pure and Applied Algebra*, 153 (2000) 151-164

[8] Huard, F. Tilted algebras having underlying graph D_n, *Ann. Sc. Math.* Québec (2001).

[9] F. Coelho, J. A. de la Peña, S. Trepode. Non-quasitilted til-critical algebras. *Proceedings of XVI Coloquio Latinoamericano de Algebra*, Revista Matemática Iberoamericana (2007).

[10] F. Coelho, J. A. de la Peña, S. Trepode. Minimal non tilted algebras. *Coloquium Mathematicum* 111, (2008), 71-81.

[11] F. Coelho, J. A. de la Peña, S. Trepode. Tilt-critical algebras of tame type. *Comm. Algebra.* Volume 36, (2008), no. 9, 3574-3584.

[12] D. Happel, I. Reiten, S. O. Smalø. Tilting in Abelian Categories and Quasitilted algebras. *Memoirs Amer. Math. Soc.* 575, (1996).