

# ON THE HARADA AND SAI BOUND

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ABSTRACT. Work in progress.

The concept of degree of an irreducible morphism was introduced by S. Liu [SL], in 1992. This notion has shown to be a very useful tool to solve many problems. In particular, by [CLMT] we are able to determine if a finite dimensional algebra over an algebraically closed field is of finite representation type computing the degree of a finite number of irreducible morphisms.

The aim of this talk is to present some recent developments on degrees of irreducible morphisms.

It is well known that  $A$  is an artin algebra of finite representation type if and only if there exists a positive integer  $n$  such that  $\mathfrak{R}^n(X, Y) = 0$  for all  $A$ -module  $X, Y$ . Moreover, by the Harada and Sai Lemma, we can consider  $n = 2^m - 1$  where  $m$  is the maximum length of the indecomposable  $A$ -modules. In this talk, for a finite dimensional algebra over an algebraically closed field of finite representation type  $A$ , the minimum bound such that the radical of all the morphisms between modules over  $A$  is zero, is given. That is, the minimum positive integer  $n$  such that  $\mathfrak{R}^n(X, Y) = 0$  for all  $A$ -module  $X, Y$ . This bound is given in terms of right and left degrees of irreducible morphisms.

On the other hand, for such algebras we started to study how to read degrees of irreducible morphisms from its ordinary quiver. We compute the above mentioned bound  $n$ , from the ordinary quiver of a particular string algebra.

## REFERENCES

1. [CLMT] C. Chaio, P. Le Meur, S. Trepode *Degrees of the irreducible morphisms and finite-representation type*. arXiv:0911.2296. To appear in J. London Math Soc. (2011)
2. [SL] S. Liu. *Degrees of irreducible maps and the shapes of Auslander-Reiten quivers*. J. London Math. Soc (2) 45, (1992) 32-54.  
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