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*Jordan types and the associated graded algebra of an Artinian algebra.* Preliminary report.

Let  $A$  be an Artinian Gorenstein [AG] algebra – graded or local – and  $M$  a finite dimensional module over  $A$  of length  $n$ . The Jordan type  $J_\ell$  of a nilpotent multiplication map  $\ell$  on  $M$  is the partition of  $n$  giving the sizes of the Jordan blocks of  $m$ . A standard graded AG algebra  $A$  with unimodal Hilbert function  $H$  has the strong Lefschetz property when the Jordan type  $J_\ell$  of a suitable linear element is the conjugate of  $H$ ; and  $A$  has the weak Lefschetz property if the number of parts of  $J_\ell$  is Sperner number of  $A$ : the maximum value of  $H(A)$ .

The generic Jordan type of  $M$  is  $J_\ell$  for a generic element of the maximum ideal  $m_A$ . We discuss properties of the Jordan type, and give examples where the generic Jordan type is not strong Lefschetz.

The associated graded algebra  $A^*$  of a local AG algebra has a stratification by ideals whose successive quotients are reflexive  $A^*$  modules. Applying this to certain non-standard graded AG algebras, we determine what appear to be new invariants of  $\text{Gr}_m(A)$ . We show that there are AG algebras that are not strong-Lefschetz, but that have non-homogeneous elements of strong-Lefschetz Jordan type – observed with Shujian Chen on a module arising from invariant theory. (Received January 17, 2018)