
FABRIZIO ZANELLO, Department of Mathematical Sciences, Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931-1295, USA

Interval Conjectures for Gorenstein and Level Hilbert Functions

The theory of Gorenstein and level algebras is an important topic in combinatorial commutative algebra, both for its intrinsic interest and for its applications to several other fields—such as algebraic geometry, invariant theory, and even complexity theory.

In this talk I will discuss two conjectures I have recently formulated (F. Z.: “Interval Conjectures for level Hilbert functions”, *J. Algebra*, to appear): the “Interval Conjecture” (IC) and the “Gorenstein Interval Conjecture” (GIC).

These conjectures are inspired by the research performed in this field over the last few years. In particular, a series of recent results seems to indicate that it is nearly impossible to characterize explicitly the sets of all Gorenstein or level Hilbert functions. Therefore, the purpose of the IC and the GIC is to at least prove the existence of a very strong—and very natural—form of “regularity” in the structure of such important and complicated sets. We seem still far from proving these conjectures in full generality today, even though I have already succeeded in a few (very particular) cases.

In this talk I will also discuss the background and the main results obtained so far in this area, as well as the techniques I have employed to begin studying the two conjectures.