

The structure of residual intersections

Hamid Hassanzadeh

The title is reminiscent of the seminal work of Huneke and Ulrich, “*The structure of Linkage*” [2]. In that paper, Huneke and Ulrich show that in a Gorenstein local ring, the whole linkage class of a Cohen-Macaulay ideal has a unique deformation that is the generic link. The results lead to surprising facts about smoothability of *licci* ideals.

Attempting to extend these results to *residual intersections*, one faces obstacles in every step of the procedure. Accordingly, the known cases where the deformation properties hold require some strong hypotheses on the number of generators and Cohen-Macaulayness of Koszul homologies.

This talk introduces and reviews a new approach toward residual intersections called the *Koszul-Fitting ideal* (Kitt)[1]. We see how Kitt-ideals facilitate the study of the deformation of residual intersections, determine their generators, and provide estimations for their Hilbert functions and the Castelnuovo-Mumford regularity.

References

- [1] Vinicius Bouça and S. Hamid Hassanzadeh, *Residual intersections are Koszul-Fitting ideals* *Compositio Math.* 155 (2019), 2150–2179.
- [2] C. Huneke and B. Ulrich, *The structure of linkage*, *Annals of Math*, 126 (1987), 277–334.